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Pan-American Exposition

New Jersey Hand-Book

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STATE HOUSE.

Pan-American Exposition.

NEW JERSEY HAND-BOOK.

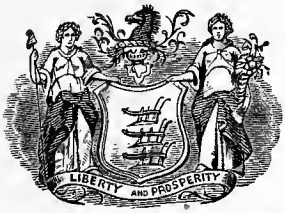
PUBLISHED BY THE STATE BOARD OF AGRICULTURE,

As authorized by the Executive Committee.

EDITED BY

FRANKLIN DYE,

Secretary.



TRENTON, NEW JERSEY.

JUNE 1, 1901.

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NEW JERSEY HAND-BOOK.

PUBLISHED UNDER THE AUSPICES OF THE NEW JERSEY STATE BOARD OF AGRICULTURE.

INTRODUCTORY NOTE.

The object in the preparation of this hand-book is to give such information as may be helpful to those who wish to learn more about a State whose resources, possibilities and advantages on many lines are not generally known and which have been ignored or passed by by those in quest of the best location, whether for educational advantages, business, agriculture or retirement. To all who may be seeking such a place, we invite a careful consideration of the superior advantages possessed by New Jersey. For details see accompanying pages.

ACKNOWLEDGMENT.

In the preparation of this book, it gives me pleasure to acknowledge the kind assistance of Francis B. Lee, Esq.; J. Brognard Betts, Deputy State Superintendent Schools; Professor John C. Smock, State Geologist; William Stainsby, Chief of Bureau of Labor and Statistics; Dr. Edward B. Voorhees, Professor of Agriculture and Director State Experiment Station; Professor E. W. McGann, Director State Weather Service; Hon. Thomas F. Austin, Superintendent State Oyster Commission; Hon. Henry I. Budd, State Road Commissioner; Professor Boris D. Bogen, Principal Baron de Hirsch Agricultural and Industrial School, and Samuel B. Ketcham, Esq.

FRANKLIN DYE.

Foster M Voorhees

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OUTLINE HISTORY OF NEW JERSEY.

BY FRANCIS B. LEE, TRENTON.

Recent scientific investigation justifies the belief that New Jersey was the habitation of man at a period long before the dawn of recorded history. This assumption is based upon the discovery of certain objects, unquestionably fashioned by human hands, and which, for thousands of years, have laid undisturbed in the sand, gravel and river-wash, carried down, in the glacial period, by the drainage of the Delaware valley. These objects have been found in and near the city of Trenton, where, in the Age of Ice, the Delaware river emptied into a shallow bay, whose waters covered all but the highest points in the southern part of the State.

From the presence of these objects, which are largely of argellite, and bear a striking resemblance to paleolithic implements found in Europe, as well as from the remains of certain extinct animals and from the discovery of human skulls and bones, a group of scientists, of international reputation, have concluded that Man, variously known as "Glacial," "Argellite" and "Paleolitic," resided at or near Trenton at a time vastly antedating the presence of the Indian. In culture, this first Man in New Jersey, whose only record are the evidences mentioned, was probably similar to Man of the early Stone Age of Europe.

Between this primeval occupancy and the twilight of recorded history ages elapsed in silence. Not until the arrival of the transient Old World navigators and the permanent settlers from Holland is there positive proof that New Jersey was the home of human beings. But when the Dutch established themselves on Manhattan island, and as early as 1620 threw their outposts of civilization across the Hudson into New Jersey, they came into association with a so-called native

race, the Lenni-Lenape, or Delaware Indians, members of the great Algonkin family.

Few in numbers and scattered in shifting communities along the river valleys and seacoast, the Indian of New Jersey had made some progress in agriculture and in the elementary arts, had a form of tribal government, partially matriarchal, and were less war-like than were the Indians of New England and central New York. For the latter reason, as well as on account of the philanthropic attitude of the Society of Friends in West Jersey, the history of New Jersey, except for easily-suppressed shows of violence, is free from the lurid lights of rapine, murder and the torch, so characteristic of the early development of neighboring colonies. Indeed, the Indian of New Jersey early lost his racial identity, and assimilating to a slight extent with the dominating races, but mainly with the Negro, has become interesting simply from a sentimental or historical standpoint.

Lenni-Lenape of the full blood are now extinct in the State.

HOLLAND AND SWEDEN.

To the struggle for commercial supremacy between Holland and Sweden New Jersey owes her settlement. Stimulated by political, religious and economic liberty at home, and thirsting for world-power, Holland sought in the East Indies and upon the Atlantic coast of North America the establishment of colonies. With Hudson and Mey in her ships, the flag of the Netherlands was carried into the Hudson and Delaware rivers, and claim was laid to the soil of New Jersey. Under her West India Company, Holland guaranteed stable government to settlers who, by 1650, had occupied lands upon the banks of the Hudson, Passaic, Hackensack, Raritan rivers and smaller streams tributary to New York harbor, and had attempted the development of a colony at Cape May and near the city of Camden. These settlements were largely, if not solely, of an agricultural character, and it is to the Dutch farmer that New Jersey, particularly the eastern part of the

State, is indebted for the beginnings of her agricultural prosperity.

Under the masterful hand of Gustavus Adolphus, the "Cæsar of the North," Sweden, by 1635, had become a formidable rival of Holland. Disregarding the Dutch claim to the Delaware valley, an expedition, supported by the contributions of the court and the people, left Sweden in 1638 to assert Sweden's claims in the New World. Similar enterprises followed, and a Swedish population settled in the State of Delaware, in Philadelphia and its vicinity, and in New Jersey between Burlington and Salem. The New Jersey settlements were few in number and much isolated, devoted more to fur trading with the Indians and fishing than to farming. A degree of prosperity gave promise of success to these undertakings, but in the home country sudden political changes incident to the death of Gustavus Adolphus led Sweden to neglect her colonies over sea. Holland, quick to take advantage of the helplessness of the Swedes on the Delaware, subdued the colony in 1655, in a military expedition during the progress of which not a drop of blood was shed. Thenceforth, for nine years, New Jersey was under the absolute domination of Holland.

Upon the later life of the people of New Jersey the Dutch made a powerful impression. In the northeastern portion of the State the Hollander preserved racial characteristics in spite of drastic political changes. He maintained his church distinct until the present day, kept his speech in current use until long after the Revolution and stamped upon the body politic well-defined principles of home government. His farms were the homes of men eminent in State history, while in his school and church liberty of conscience and of speech were taught.

Confined to the southern part of the State the influence of the Swede was less pronounced. Owing to the sparseness of the settlements and the inability of the Crown to care for the interests of the colonists, the Swedish Lutherans slowly merged into the Church of England, the mother tongue early

became forgotten and but little remains of the Swedish influence, except the family names and a spirit of independence and honesty, traceable to Viking ancestors through generations of an unassuming but virtuous race of State-builders.

THE COMING OF THE ENGLISH.

The Restoration of the House of Stuart, in 1660, virtually marked the beginnings of English rule in New Jersey. The Crown recognized that Holland's control of the valleys of the Hudson and Delaware separated the New England from the southern colonies, and menaced the power of England in North America. Basing the claims of the Crown upon the discoveries of the Cabots, Charles II., upon the 12th of March, 1664, conveyed to his brother James, Duke of York, an empire in the New World, including much of New England, New York and all of the present territory of New Jersey. To substantiate this grant, an armed expedition entered New York harbor in the summer of 1664, secured the capitulation of the Dutch authorities and a formal transfer of Holland's claims to soil and government in North America was made to England. In the early spring of the same year the Duke of York transferred practically what is now New Jersey to John, Lord Berkeley, and Sir George Carteret, two devoted adherents of the House of Stuart, during the Commonwealth. In recognition of Carteret's defense of the island of Jersey against the forces of Cromwell, the Berkeley-Carteret grant was called New Jersey (Nova Cæsarea).

Unlike many other royal grantees in America, Berkeley and Carteret personally essayed the development of their colony. To encourage settlement, a government of an exceedingly liberal character was guaranteed, and especial stress was laid upon the advantages New Jersey offered to farmers. The natural fertility of the soil, the geniality of the climate, and the advantages of low-priced land were set forth as inducements for colonization, as well as the nearness of mines and

fisheries. Emigrants speedily came from England, Scotland and New England, particularly from Long Island and Connecticut. A large proportion were of Presbyterian and Congregational connections, and took up land in Newark, Elizabeth, the mouth of the Raritan and along the north shore of Monmouth county. Here was created a social, political and religious atmosphere contemporaneously identical with that of New England. The growth of small individualistic communities is most noticeable, the "town meeting" ruled public opinion, legal penalties were taken from the Hebraic Dispensation, and the minister became the teacher as well as preacher.

In the meantime the valley of the Delaware remained unsettled.

Scarce had the communities around New York harbor become established ere Berkeley sold his interests to a company of Quakers from England. To adjust the claims of the new owners and the rights of Carteret, a division of the colony was made in 1676. From a point in Little Egg Harbor, on the seacoast, to a point near the Delaware Water Gap a line was drawn. Carteret secured East Jersey; Berkeley and his assigns obtained West Jersey.

THE TWO JERSEYS.

The Society of Friends, largely under the leadership of William Penn, designed West Jersey as a model commonwealth, where as much freedom should be allowed the individual as was consistent with the doctrines of the Society. A frame of government, the most democratic the world had then seen, was circulated among the English Quakers, and between 1676 and 1690 Salem, Burlington, Newton, Trenton and Cape May had sprung into existence. Large plantations were established along the Delaware and its tributary streams and a landed aristocracy grew up, sustained by intermarriage of prominent families and by "redemptioner" and slave labor. The county towns became social and political centers, and a

type of society similar to that of Virginia, Maryland and the Carolinas resulted. There was, consequently, less of the more strenuous life of the Eastern division.

The dominant influence in the political history of both East and West Jersey was two separate Boards of Proprietors —one for each division. In each instance, the Boards were comprised of landed capitalists—many of whom were non-residents—and who became seized of the soil of the State by transfers from Berkeley and Carteret. In these Boards were lodged governmental powers, the most conspicuous of which was the right to select Governors for the respective divisions, which right Berkeley and Carteret had derived from the Crown. To this there was a constantly-growing objection on the part of settlers, which, in East Jersey, developed into open revolt. Nor was the situation improved by the stand previously taken by the Duke of York, after his accession as James II. In 1673 New Jersey was recaptured by the Dutch, who remained in possession for a few months. With a Stuart disregard for previous grants and charters, James II. claimed the right of proprietary government over New Jersey, and commissioned Sir Edmond Andros as Governor, nor was it until 1681 that the Crown finally established the governmental rights of the Proprietors. At last, recognizing the futility of their efforts, both Proprietary Boards relinquished to the Crown, in 1702, all claims of government, holding, simply, their title to the soil. Both Boards are still in existence, and retain their land title—so far as it has not been alienated—the only instance of its kind in the United States.

NEW JERSEY AS A ROYAL COLONY.

The history of New Jersey for a period of seventy-five years of royal colonial life is interesting as illustrative of a slow but steady evolution, rather than for any dramatic incidents. The conditions of life were largely agricultural, the small farmer developing East Jersey, the plantation-owner becoming more apparent in West Jersey. Upon either side Phila-

delphia and New York were objective markets and small craft of all kinds plied between the towns and farms of New Jersey and the cities. But among the small farmers there was a spirit of discontent. As was so frequently the case, the Crown was unfortunate in its choice of unworthy court favorites as Governors; the landed proprietors secured seats in the Governor's Council and influenced the popular branch of the legislature; property qualifications disenfranchised electors; small manufactures were prohibited by the acts of Parliament; trade was restricted by the Navigation acts, while metallic money was drawn away from the colony by the stupid economic policy of the Lords of Trade and Plantations. Nor could the small farmer, for want of ready money, buy slaves or "redemptioners." While loyal to the Crown, there were, nevertheless, mutterings of discontent, of ill-concealed defiance of law officers and a spirit of restlessness, restrained by the wave of patriotism evoked by the French and Indian war, but which swept on with increasing force after the opening of the year 1770.

The most notable events of this period, from 1702 to 1775, were the suppression of piracy in the vicinity of New York and Cape May; the establishment of a continuous land and water route from Philadelphia and New York; the erection of ferries and post roads; the appearance, in the northern, central and western parts of the colony, of Huguenot, Scotch-Irish and Palatinate emigrants; the chartering of Princeton University and Rutgers College; the establishment of the first Indian reservation in the United States in Burlington county, to which point most of the New Jersey Indians were removed; the religious revival of George Whitefield, and the promulgation of John Woolman's abolition doctrine; the massacres by the Indians in Sussex county, and the erection of a series of barracks, owing to their need in the French and Indian war, in various parts of the State.

NEW JERSEY IN THE REVOLUTION.

Whatever spirit there was in New Jersey, at the outbreak of the Revolution, favoring absolute independence was to be found largely among the owners of small farms. In the exciting days before the struggle most of the professional classes, the members of the Society of Friends, the wealthy shipowners and the large merchants, were opposed to any radical action. True, the justice of the claims of the people of the colony was recognized by those of influence, but that the colony should declare itself free and independent savored so strongly of treason that every conservative man stood in dread of the consequences. Some were for compromise; some for agitation; but comparatively few could contemplate an existence apart from the mother country.

New Jersey asserted her statehood upon July 2d, 1776, adopting a constitution, which altered but little the form of colonial government, and contained a provision that the document should not be operative after a possible reconciliation between England and New Jersey. The war party, and the party declaring for independence, necessarily, gained new and enthusiastic adherents, although the Tory element in the State remained aggressively active throughout the period of the war. This element was led by William Franklin, the last colonial Governor of New Jersey, who, driven from the State, sought refuge among Tory sympathizers in New York City, from which points raids were projected throughout the eastern division of the State. These raids were under the local supervision of bold, cruel and dissolute Tories, whose atrocities gained for them the name of "Pine Robbers."

New Jersey in the Revolution, occupying, as she did, the point of military advantage between the North and South, was the theatre of some of the most dramatic events of the war. The retreat of Washington through the Jerseys and the capture of the British-Hessian force at Trenton, which electrified the world, was followed by the affair at Princeton.

The sufferings at Morristown, the battles of Red Bank and Monmouth Court House (Freehold), the wintering of the troops at Middlebush and Somerville, and Washington's residence at Rocky Hill, are all recorded on the pages of national history. The raids along the valley of the Hackensack, the battles of Elizabeth and Springfield, the "Affairs" in the vicinity of Salem and Tuckerton need no retelling.

THE CLOSE OF THE CENTURY.

At the termination of the Revolution, New Jersey, although the State had practically asserted her sovereignity, the concensus of opinion was that the commonwealth must form a part of the proposed closer union. New Jersey was a party to the Annapolis convention, and her delegation in the constitutional convention called to frame a more perfect union of the States, laid before that body, June 15th, 1787, the "New Jersey Plan," which, while defeated, led to the constitutional compromise upon representation.

Both in the Congress adopting the Declaration of Independence, in 1776, and the convention adopting the Constitution of the United States, in 1787, the representatives from the State of New Jersey occupied conspicuous positions. The signers of the Declaration from this State were Richard Stockton, the eminent lawyer of Princeton; John Witherspoon, President of the College of New Jersey, now Princeton University; John Hart and Abraham Clark, men of piety and learning. Those who affixed their signatures to the Federal Constitution were William Livingston, the Revolutionary War Governor, and his successor in office, William Paterson; David Brearley, Chief Justice of New Jersey, and Jonathan Dayton, an eminent patriot. It was William Paterson who presented to the convention the famous New Jersey Plan.

The adoption of the constitution and the certainty of a permanent and well-defined form of national government, stimulated State life. Before the close of the century Trenton

was selected as the State capital; Alexander Hamilton and his friends, by means of the Society for the Promotion of Useful Manufactures, laid the foundations of Paterson; wagon and post roads, with attendant ferries, were improved, and the farm lands of the northwestern part of the State came under cultivation. Party politics ran high. The old Tory element, the members of the Society of Friends in West Jersey, who throughout the Revolution had been non-combatants, for conscience sake, were Federalists; while stimulated by a party press and the democratic tendencies of the young but vigorous Methodist Episcopal Church, the anti-Federalists grew in strength. To the anti-Federalists party came many of the old privates of the Revolution and much of the Calvinistic element in East Jersey. The crisis was reached in the election of Thomas Jefferson as President in 1800, to which end New Jersey largely contributed.

THE NEW CENTURY.

The year 1800 saw New Jersey upon the threshold of enterprises of great magnitude. Within the next decade the first banks in the State were chartered in Trenton and Newark, a bridge connecting New Jersey and Pennsylvania was constructed at Trenton, both events occurring in the year 1804; an agitation for canals swept over the State; John Stevens and his son, Robert L. Stevens, at Hoboken, applied steam to single and twin-screw propellors and constructed the first ocean-going steamboat, the "Phœnix;" the mail service was extended, while produce from the farms of New Jersey found ready market in the growing cities across the Hudson and the Delaware. At its incipiency the second war with England was not altogether a popular measure in New Jersey, and, indeed, for a time the "Peace" or Federal party regained political control of the State. New Jersey, however, as much for the protection of Philadelphia and New York, as for her own interest, furnished militia to garrison Billingsport, on the Delaware and Sandy Hook, at the entrance of New York

harbor. The position of the State led to overland transportation of military supplies between the North and South, for the reason that the Atlantic seaboard was blockaded by British fleets. From this condition and owing to the demand for good roads, the first railroad charter ever granted in the United States passed the Legislature in the year 1815. This, in connection with the revival of agitation concerning internal waterways, led to the constructing of the Camden and Amboy railroad and the Delaware and Raritan canal, now a part of the standard lines of the Pennsylvania Railroad system across the State of New Jersey.

THE INDUSTRIAL ERA.

The period from the close of the second war with England to the Civil war was marked by the growth of the great centers of population in New Jersey. A large foreign-born element entered the State. Jersey City, chartered in 1804, became the terminal point of railroads now a part of the national trunk systems; Newark's industries, particularly leather, were vastly stimulated; Camden, by 1840, became a manufacturing center; Paterson's silk industry was centralized, while the projection of the railroads led to the opening of fertile agricultural districts throughout the State. The iron, zinc and copper mines were developed. The public school system was extended, while reforms in penal and charitable institutions were instituted In 1844 the makeshift constitution of 1776 was abandoned, and a new constitution, more in harmony with the spirit of the times, was adopted.

THE CIVIL WAR AND THE CLOSE OF THE CENTURY.

The Civil war found New Jersey ready to respond to the call for troops. To the cause of the Union she furnished 88,305 men, or within 10,501 of her entire militia, and for the organization, subsisting, supplying, supporting and transporting her troops she paid nearly three million dollars. Fol-

lowing the war came the period of prosperity. Attention was drawn by the late Charles K. Landis and other pioneers of an agricultural movement to the undeveloped possibilities of South Jersey. Vineland, Hammonton and Egg Harbor were laid out, and the culture of small fruits, berries and grapes was attempted, practically assuring the future of these industries. The pressing needs of Philadelphia and New York led to the development of dairying and the establishment of railroad milk service. Market gardens were cultivated within the metropolitan areas, while the oyster and fishing interests attracted the attention of capitalists.

By 1885 the resorts which dot the coast of New Jersey had sprung into existence. Although Cape May and Long Branch had become frequented as early as 1810, the absence of direct railroad communication hindered progress in town-building until Atlantic City was incorporated in 1854. In the early 70's Asbury Park and Ocean Grove came into being, and during the next fifteen years these were followed by a score of towns whose only reason for existence upon the dunes was that they should furnish health and pleasure to hosts of visitors.

Within the past decade other changes have taken place, which will affect the life of the people of the State. Particularly is this true from the agricultural standpoint. Into the unoccupied lands of South Jersey have come the Russian Hebrews, successfully overcoming obstacles, while the reclamation of the "Pines," either by State aid or individual efforts, and the prohibition of wasteful forest fires will prove a source of untold revenue to the citizens of New Jersey. In the vicinity of New York is centering a vast population, which agricultural New Jersey must supply with many of the necessities of life. Those who work in the mills and factories cannot till the soil, and a State which has so well sustained itself in the past may find in the problem of supporting its non-agricultural residents a solution for some of the difficulties which now beset the agricultural elements of New Jersey's population.

NEW JERSEY.

BY JOHN C. SMOCK, STATE GEOLOGIST.

I. Geography and Physical Features.

GEOGRAPHIC POSITION.

Latitude	41° 21′ 22.6″ 38° 55′ 40″
Longitude	73° 53′ 39″ 75° 35′ 00″

EXTREME DIMENSIONS.

Length	166 miles.
Breadth	57 miles.

AREA.

Square miles	8,224.44	
Acres	5,263,641	
Land surface	4,809,218	acres.
Water surface	454,423	"
*Upland	4,494,567	"
Tide-marsh	296,500	"
Beach (coastal dunes)	18,151	"
**Forest	2,069,819	"
Cleared upland	2,424,748	"
Improved land in farms	1,999,117	"

I. New Jersey is on the Atlantic slope of the continent and is divided into four topographic zones: 1, the Appalachian zone, including the Kittatinny mountain and the Kittatinny valley; 2, the Highlands; 3, the Red Sandstone or Triasoic area; and 4, the Coastal plain.

These divisions are based on both the geology and the topography, the geologic structure and the topographic features being closely related and explanatory of the surface configuration and conditions. Beginning at the northwest the Kitta-

* Upland as distinguished from tide-marsh, but including all swamp and fresh meadows.

** Includes all lots of ten acres and upwards.

tinny or Blue mountain is a remarkably level-topped and narrow range, which extends across the State from the New York State line, where it is known as the Shawangunk mountain, to the Delaware river at the Delaware Water Gap. At High Point, near the northernmost point of the State, it is 1,804 feet high, which is the greatest elevation of the State. This mountain range is rough, rocky and nearly all wooded.

The Kittatinny valley, ten to thirteen miles wide, is shut in by the Kittatinny mountain on the northwest, and by the Highlands on the southeast. It is characterized by its high, rolling hills and minor valleys and its pleasing landscapes and beautiful farming country, which is continuous, on the northeast, with the valley of Orange county in New York, and to the southwest stretching away into the great Cumberland valley of the Atlantic slope of the continent.

II. The Highlands occupy that part of the zone of crystalline rocks which crosses New Jersey in a general north-northeast and south-southwest direction. Its surface is hilly-mountainous, and is made up of several parallel ridges, separated by deep and generally narrow valleys. The latter are like the Kittatinny valley—smooth—and are largely cleared and in farms. The mountain ranges are remarkably uniform in height, and this division may be considered as a seaward-sloping tableland, whose northwest side has an elevation of 1,000 to 1,500 feet above the ocean, and its southeastern side 600 to 900 feet above the sea. In the northern part there are several well-known lakes well up on the mountains—Hopatcong, Greenwood, Macopin, Splitrock, Green, Wawayanda and Budd's lakes are the more important of these natural upland sheets of water in the Highlands.

III. The Piedmont plain, or the Red Sandstone plain, is made by the shales and sandstones of the Triasoic age. The Highlands stand on its northmost border; on the southeast it merges into the clays and marls of the Coastal plain. It is sixty-seven miles long and thirty miles wide at the Delaware river. The trap-rock ridges, known as Palisades, Watchung, Sourland, Cushetunk and other mountain ranges rise abruptly

above the general level of the Sandstone plain. They are generally forested, whereas the sandstone country is nearly cleared and in farms. These mountains rise 400 to 900 feet above sea level. The drainage is largely by the Hackensack, Passaic and Raritan rivers and their tributaries.

IV. The Coastal plain zone includes all the country southeast of the Triasoic Sandstone area and borders the ocean. It is 100 miles long from Sandy Hook to Salem and is ten to twenty miles wide. The surface is hilly in part, but with gentle slopes, except where some of the streams have cut their way through its earthy beds and formed steep-sided stream valleys. The Navesink Highlands and the Mount Pleasant hills are the highest lands in it. The drainage is by many tributaries westward with the Delaware, and by the Atlantic coast streams into the ocean. In the northwestern part of this zone there are clay-beds and greensand marls, which make the outcrop on the surface in places; on the southeast there are sands, clays and gravels and fringing the ocean a narrow range of sand hills or coastal dunes.

II. Geological Formations.

The study of the geologic structure and the mapping of the formations have been given a long-continued and steady support by the State. The first geological survey was ordered by the Legislature of 1835, and was begun in 1836 under the direction of the late Professor Henry D. Rogers. The results were published in 1836 and in 1840. In 1854 the survey was re-organized by Governor Rodman M. Price, and William M. Kitchell was made State Geologist. It was continued until 1857, and annual reports were published. The Legislature of 1864 revived the survey, and the late Professor George H. Cook was, by the act of organization, constituted State Geologist. The work has been carried forward under subsequent acts authorizing the continuance.

The geologic structure of the State is so related to the

topography that the notes on the physical features give a clue to it. All of the larger geological formations of the United States, except the coal, occur in parallel zones, as indicated in the description of the topography. They run from northeast to southwest, and a section line across the State from Port Jervis southeast to the ocean crosses them nearly at right angles to their trend or direction.

The oldest geological formations in the State are the crystalline rocks of the Highlands. Granite, gneisses and other crystalline shistose rocks and beds of magnetic iron ore make up the mass of these mountain ranges. These rocks are generally much tilted in position, almost on edge, and are also much faulted. They strike northeast and southwest and dip to the southeast or northwest. The iron ores and zinc ores which are mined in the State are found in these formations. The granite, gneiss and crystalline limestone or marble, used in building, are also from these Highland formations.

The Paleozoic rocks are found in the valleys included in the Highlands, in the Kittatinny valley and Kittatinny mountain, and in the Green Pond and Copperas mountains. Cambrian, Silurian and Devonian are represented, and the rocks are limestones, slates, sandstones and siliceous conglomerates. The magnesian limestones and the slates constitute wide belts in the Kittatinny valley, the Musconetcong, Pohatcong, Pequest and other valleys. The Kittatinny Mountain mass consists of sandstones and conglomerates of the Oneida and the Medina epochs of the Silurian age. In the valley of the Upper Delaware, west of this mountain, there are narrow belts of water-lime, Lower Helderberg and Upper Helderberg, fossiliferous limestones, with Marcellus shale as the highest member of the Devonian within the State. The Green Pond Mountain rocks also have been referred to the Oneida horizon. The limestones and slates are the formations on which the rich wheat lands of Warren county and the dairy farms of Sussex are situated. Stone for building, slate for roofing and flagging stone, and limestone for lime and cement, are quarried in the Paleozoic areas. Copper,

lead and zinc ores, and barite, limonite, or brown hematite, and glass sand have been worked in many localities.

The red shales and sandstones and the included trap-rocks of the northern-central part of the State are referred to the Jura-Trias of Mesozoic time. The sandstone beds dip in general toward the northwest, at a low angle of inclination in the sandstone. The erupted trap-rocks form long ranges of steep-sloping hills or mountains, often crescentic in form. A great deal of excellent sandstone for building and stone for road-making is quarried in this formation. Copper ores were mined formerly at many places. These ores occur in the sandstone near the trap-rock or at their junction. Barite also has been mined in the sandstone at one locality.

The Cretaceous rocks of the State include the clay district of Middlesex county and the greensand marl, which is so characteristic, developed in Monmouth and thence southwest to Salem. A large amount of clay is dug in the Raritan clay district for various uses. The greensand marl, dug in shallow pits generally, and in numberless localities, has had a wide use locally as a fertilizer.

The formations of the Coastal Plain zone later than the Cretaceous beds, are greensand marls of the Eocene, clays and sands of the Miocene, and the clays, sands and gravels of the post Tertiary. They are recognized in a fourfold division, and are known as Beacon Hill, Bridgeton, Pensauken and Cape May formations. Clays and sands for brick, terra-cotta and pottery; marls for fertilizer; glass sands and gravel for road-building are dug in these formations.

In the northern part of the State there are surface formations of glacial epochs, and the terminal moraine of the last glacial ice is traced from Perth Amboy by Morristown and Hackettstown to Belvidere on the Delaware.

Alluvial deposits of recent time are recognized in the river valleys and in the tidal marshes and in some of the fresh-water swamps.

III. Economic Geology.

IRON ORES.

The magnetic iron ores are the basis of the iron-mining industry. There are mines of limonite, or brown hematite, and of red hematite also, but at present they are not worked. There are about seventeen active iron mines, and in 1900 the output of these mines amounted to 342,390 gross tons. There are many mines which were not at work at all during the year, and many of them have been idle for several years. Ore in workable quantity has been found at many more localities. The large producing mines are in Morris and Warren counties. The ores are used in furnaces in the Lehigh district of Pennsylvania or in the furnaces in the State.

The manufacture of iron was begun in New Jersey as early as 1682, and at Tinton Falls, Monmouth county. Bog iron ores, dug in the southern parts of the State, were used up to the middle of the present century. The mines of the magnetic iron ores have yielded the greater part of the total production of the State, which is estimated to amount to 18,000,000 tons.

ZINC ORES.

The famous ore deposits at Ogdensburgh and Franklin Furnace, in Sussex county, continue to be worked. The output for 1900 was 194,881 tons. The ores are the red oxide, silicate and franklinite.

Other localities where zinc blende occurs have been exploited, but have not been developed into mines.

COPPER ORES.

Copper ores are widely distributed in the red sandstone district. The Schuyler mine, at Arlington, the Plainfield, Bridgewater and Flemington mines and others have been worked. The Schuyler mine is being reopened, and the mine

near Somerville and works for the working of the ores are being erected.

LEAD, in the form of galena, has been mined in Sussex county. ARSENICAL and NICKELIFEROUS PYRITES also occur, but not to any workable extent as thus far opened in a few localities.

GRAPHITE, PLUMBAGO, BLACK LEAD.

Graphite is disseminated widely in the crystalline schistose rocks of the Highlands. Mines have been opened and worked, irregularly, at Bloomingdale, High Bridge, and near Peapack.

MOLBYDENUM occurs in form of molybdic sulphide at the Ogden mines and at the Hude mine, Sussex county, but is not worked.

BARITE, BARYTES, HEAVY SPAR.

Barite has been found in quantity for mining near Newton and at Hopewell.

CLAYS.

Fire-clay, stoneware clay or potter's clay, paper clay, terra-cotta clays, pipe clay and brick clays are dug extensively. The Raritan clay district is justly famed for its numerous and large pits, the superior quality of its clays and their extensive use, both in the large establishments located in the district and outside wherever fire-clay or ware clay is in demand. The large openings are near Woodbridge, Perth Amboy, Sand Hills, South Amboy, Sayreville and Chesquake. Clays for ware and for terra-cotta are obtained near Trenton, at Palmyra, and at other points in the clay belts of the State. Fire-clays are dug near Wheatland and Winslow, and there are large clay works at Winslow. There are still other localities which produce some clays for local manufacturing, and in the southern part of the State. Brick-earth, or brick-clay, is found in thick beds along the Raritan river and Raritan bay, along the Delaware, on the Hackensack, and there are very large brickyards on these navigable, tidal waters, which make a large part of the brick used in structural work in New York and Philadelphia.

Fire-sand, *kaolin* and *feldspar,* as well as fire-clay, are also dug extensively in the Raritan clay district and put into fire-brick.

GLASS-SAND.

Sand for glass is found at many localities in the southern part of the State, and is used in the glass-houses at Millville, Salem, Bridgeton, Glassboro, Clayton and other places, and is shipped to distant points on the Atlantic coast, from New England to the South. The deposits are apparently inexhaustible.

BUILDING-STONE.

Reference has been made to the occurrence of granites, trap-rocks and sandstones in some of the geologic formations. Granite has been quarried at Charlottenburg, in Morris county, and Pochuck mountain, in Sussex county. Gneisses, for heavy bridge work, are quarried at Dover, and at other localities as demand calls for them.

Sandstone quarries at Avondale, Newark, Paterson, Little Falls, Haledon, in the eastern part of the State, and at Stockton and Greensburg, or Wilburtha, on the Delaware river, are well known as producing localities of brownstone for cut work. The occurrence of trap-rock so widely distributed, and so accessible to railway and canal lines, is making the output of trap-rock an increasing one, on account of its excellence for State roads.

The marbles of the State are not at present worked.

Slate for roofing has been quarried at the Delaware Water Gap, and at Newton and Lafayette, in Sussex county. The Newton quarry is now worked.

Flagging-stone quarries are opened near Deckertown, in Sussex county; at Milford, on the Delaware, and at Woodsville, in Mercer county. The Green Pond Mountain range also affords a flagstone.

Limestone, suitable for the manufacture of Portland cement, is quarried extensively near Phillipsburg, in Warren county.

Lime is made from limestone in large quantities at McAfee Valley, Sussex county, and at other points in the northern part of the State.

The natural fertilizers, as greensand marl, white calcareous marls, muck or peat, are common.

MISCELLANEOUS.

Infusorial earth occurs in workable quantity near Drakesville, Morris county.

Manganese ore has been mined near Clinton, Hunterdon county.

Two mines for mica have been opened, both in Warren county.

Steatite occurs in Marble mountain, and in Jenny Jump mountain, in Warren county.

Apatite, with magnetite, makes a large deposit near Ferromont, Morris county.

STATE NORMAL SCHOOL.

EDUCATION.

BY J. BROGNARD BETTS, ASSISTANT STATE SUPERINTENDENT.

HISTORICAL.

The records of the schools of New Jersey during the early days of its existence as a colony are very meagre, but it is probable that the first schoolmaster, certainly the first in the eastern part of the State, was Englebart Steenhuysen. He taught in what was then known as the "Town of Bergen," now a part of Jersey City. The school was established in 1662. Steenhuysen was also a minister, and on Sundays preached in the same building in which, on other days, he taught the parents of those who did so much to make our State what it is to-day—the pride of all its sons. The site on which this first school-house was erected is still used for school purposes, and from that humble beginning has grown what is known as Public School No. 11 of Jersey City, with its twenty-four teachers and its accommodations for one thousand pupils.

This school was supported by tax, and was the cause of litigation in 1672, some residents of outlying districts refusing to pay their portion of the tax for its support, until compelled by the courts, on the ground that the school was too far removed to be of any benefit to them.

About ten years later the first school, of which there is any record, was established in Newark. This school was maintained by subscriptions, and the schoolmaster was authorized to charge tuition fees for the children of residents who had not subscribed to the support of the school.

Other schools were established in East Jersey about this period, among them being those at Woodbridge, Perth Amboy, Elizabethtown, Freehold and Piscataway.

The first school established in West Jersey, of which there is any record, was at Burlington in 1683. The income derived from the revenues of an island in the Delaware, opposite the town, were set apart to defray the expenses of the school. The fund thus established is still in existence, and the income appropriated for public school purposes.

The first legislation relative to public schools was in 1693, when an act was passed authorizing the inhabitants in the several towns and townships to establish schools and maintain the same by taxation.

In 1817 the Legislature enacted a law creating a school fund, the income from which was to be devoted exclusively to school purposes. This fund was under the control of the Governor, the Vice President of the Council, the Speaker of the Assembly, the Attorney-General and the Secretary of State. Certain United States bonds, bank stocks and other securities were set apart for the fund. In 1871 the moneys received from the sale and rental of lands under water owned by the State were made a part of the fund. By an amendment to the State Constitution the principal of the fund must be kept invested and the income devoted exclusively to the support of free public schools. The principal of the fund now amounts to $3,690,682.62, and $200,000 of the income is appropriated annually for the support of public schools. The fund is now under the control of the "Trustees of the Fund for the Support of Free Schools," the board being composed of the Governor, Attorney-General, Secretary of State, State Comptroller and State Treasurer.

In 1820 the Legislature authorized the several townships to levy a tax for the education of "such poor children as are paupers, belonging to the said township, and the children of such poor parents, resident in said township, as are or shall be, in the judgment of said committee, unable to pay for schooling the same." This law remained in force for some years, being amended, from time to time, and in such a manner as to provide for free schools for such time as the moneys received from the school fund and from local taxation would permit,

and allowing tuition fees for the remainder of the year, but it was not until 1871 that legislation was had providing for a State school tax, and making the schools absolutely free to all the children in the State.

PRESENT SCHOOL SYSTEM.

There is a State Board of Education, appointed by the Governor and confirmed by the Senate. The board is composed of two members from each Congressional district, who shall not belong to the same political party. The term of office is five years. The members serve without compensation, but are paid the actual expenses incurred by them in the discharge of their official duties.

This board appoints the County Superintendents of Schools, makes rules for the holding of teachers' institutes, the examination of teachers and for carrying into effect the School laws of the State. It has the control and management of the State Normal School, the School for the Deaf, the Farnum Preparatory School, and the Manual Training and Industrial School for Colored Youth.

The State Superintendent of Public Instruction is appointed by the Governor and confirmed by the Senate. His term of office is three years and his salary is $3,000 per annum. He has general supervision over the schools, and, by law, is made a court of limited jurisdiction, having the power to investigate and decide, subject to appeal to the State Board of Education, all disputes that arise under the School laws, and may enforce his decision by withholding all school moneys from the district until his decision has been obeyed. He is, *ex-officio,* the Secretary of the State Board of Education, and is a member of the State Board of Examiners and of all local boards of examiners.

The County Superintendents have supervision over the schools in their respective counties, apportion the school moneys, license teachers, and, together with the local boards of education, prescribe the courses of study for their respect-

ive counties. Their salaries are paid by the State and range from $1,000 to $1,300 per annum. In addition to their salaries they are allowed their actual expenses to an amount not exceeding $350 per annum. The term of office is three years.

The State Normal School is located at Trenton and was established in 1855. There is, in connection with it, a Model School, which affords to the pupils in the Normal School an opportunity for practice teaching. The number of pupils enrolled in the Normal School is 639 and the number in the Model School is 568. The law requires that each graduate of the Normal School shall pledge himself to teach in this State for at least two years after graduation. This pledge is more than fulfilled, for during the last year 1,181 graduates of the school were teaching in the State. The total expenses of the school last year amounted to $74,708.

The School for the Deaf is located in Trenton and was established in 1882. Prior to that date the deaf children were educated at the expense of the State in institutions in New York and Pennsylvania. The number of pupils is 155, and the cost of maintenance was $38,993.

The Farnum Preparatory School is an adjunct of the State Normal School and is located at Beverly. It was built by Paul Farnum and presented by him to the State. In his will he gave the school an endowment of $20,000. The number of pupils enrolled last year was 149, and the cost of maintenance $5,780.

The Manual Training and Industrial School for Colored Youth, located at Bordentown, was established in 1894, and was under the care of a separate Board of Trustees. In 1900 it was placed under the care of the State Board of Education. There were enrolled last year 118 pupils, and the cost of maintenance was $5,354.

The entire State is divided into school districts, each city, town and township constituting a separate district. There are two classes of districts, viz., municipalities divided into wards and municipalites not divided into wards. The first

class includes the cities and large towns. In these districts members of the boards of education may be appointed by the Mayor or elected by the people. The amount of money to be appropriated locally for the support of schools is determined by the Board of School Estimate, consisting of the Mayor, two members of the financial board in the municipality and two members of the Board of Education. The second class includes the townships and small boroughs. In these districts the members of the boards of education are elected and all appropriations are made by direct vote of the people. By the law boards of education are made bodies corporate, and are not a part of the municipal government.

The Legislature, recognizing the value of manual training, passed a law in 1881 providing that whenever a school district established a manual training school or added manual training to the course of study pursued in the public schools of the district, the State would appropriate each year an amount equal to the sum raised in the district for that purpose; provided, that the total annual appropriation by the State to a district should not exceed $5,000. Under this law two cities have established manual training schools and twenty-four districts have added manual training to their courses of study. The total amount appropriated by the State last year for manual training was $46,000.

The State gives to each school annually $10, provided such school raises a like sum, to be used for the purchase of apparatus or to maintain a library for the use of the pupils; also to each county a sum not exceeding $100 annually, upon like conditions, for the purpose of providing pedagogical libraries for the use of the teachers. One thousand five hundred and one schools and all the counties, with one exception, have established libraries under the provisions of this law.

In order that the health of the children may be protected the law provides that all school-houses shall have at least eighteen square feet of floor space and two hundred cubic feet of air space per pupil; that the light area must equal at least twenty per cent. of floor space; that there must be an

approved system of ventilation and that the light must be admitted only from the left and rear of class-rooms. In order that these provisions of the law shall be obeyed, all plans for school-houses must be submitted to the State Board of Education for approval.

Each district is also authorized to employ a medical inspector, whose duty it shall be to look after the sanitary condition of the school property, to inspect the pupils and to give instruction to the teachers.

The Constitution provides that the State shall provide free education for all children between the ages of five and eighteen years, but the Legislature, recognizing the value of kindergarten and higher education, has provided that children between the ages of four and twenty years may be admitted to the public schools.

Funds for the support of public schools are derived from five sources, viz.: State school fund, State fund, State school tax, interest of surplus revenue and local tax.

The income of the State school fund, as has been heretofore stated, amounts to $200,000 per annum.

Appropriations from the State fund are made for the several institutions under the care of the State Board of Education, the expenses of the Department of Public Instruction, the salaries of County Superintendents, manual training, school and teachers' libraries, and for the support of public schools. The appropriation for the last item is to reduce the amount of the State school tax, and, by law, cannot be less than $100,000. The State school tax hereafter will be two and three-fourths mills. For the current year it is .00256, and the appropriation from the State fund, as a part of the tax for the current year, is 35 per cent. of the tax, or over $800,000, so that the actual State tax for school purposes paid by each taxpayer is reduced from $2.56 to $1.67 on each $1,000 of ratables. The State fund is derived from taxes on corporations, there being no tax on the people for State purposes, so that the appropriation of $800,000 from this fund is an actual saving, to that amount, to the people of the State.

The interest of the surplus revenue amounts to about $34,000 per annum, and is the income derived from moneys received from the United States in 1836, when the surplus in the United States treasury was divided among the States.

Local taxes may be assessed for current expenses, for school buildings and for any other purpose connected with the public schools of the district.

Moneys received by the school districts from the funds above mentioned, except local tax, can be used only for teachers' salaries and fuel, and are apportioned as follows: For each Supervising Principal, $600; for each teacher, $200, and the balance on the total days' attendance of all the pupils enrolled in the public schools of the district during the year. In order to encourage the consolidation of the schools in the rural districts and the establishing of graded schools, $200 is apportioned to each district which closes a small school and transports the pupils to another school, thereby dispensing with the services of a teacher. This apportionment is made annually as long as the pupils are transported. This provision has been the means of closing a number of schools which had an average attendance of fifteen or less, and, in addition to giving such pupils far better school advantages, has resulted in a substantial financial saving to the districts.

The number of school-houses in the State is 1,875, and the number of class-rooms 6,408, providing accommodations for 310,328 pupils. The value of the school property is $15,634.471.

There are employed in the public schools 907 male teachers, at an average annual salary of $866, and 6,105 female teachers, at an average annual salary of $500. Of the 7,102 teachers, 3,415 have had a Normal training and 409 are college graduates.

There were enrolled in the public schools last year 322,575 and in private schools 47,453, making the total number of children in school 370,028, or 81 per cent. of the children in the State. The average daily attendance in the public schools

was 207,947. The average time our schools were kept open was 186 days.

The total amount of bonded indebtedness of the school districts is $3,733,982.

The following is a summary of the finances of the public schools for the school year ending June 30th, 1900:

RECEIPTS.

State school tax	$2,333,706.00
Local tax	3,779,151.65
Interest of surplus revenue	33,386.61
District school bonds	581,733.23
Other sources	166,324.23

DISBURSEMENTS.

Teachers' salaries	$3,805,482.42
Building and repairing school-houses	1,265,170.10
Fuel and other current expenses	1,073,283.64
Debt and interest	391,116.84
Manual training	88,944.99
Text-books and apparatus	314,321.15
Expenses of State and county supervision	42,436.89
Libraries	11,380.00
Miscellaneous expenses	4,159.75

PEACH EXCHANGE, Pittstown, Hunterdon County.

RURAL ATTRACTIONS AND PRODUCTIONS.

GENERAL STATEMENT.

It is conceded that New Jersey has a greater variety of soils and products; richer and more highly-flavored fruits, and a more salubrious climate the year through than any other State of its size in the United States.

"A Pittsburg paper having alluded slightingly to the 'sand-flats of Jersey,' Rev. J. M. Buckley, editor of the *Christian Advocate,* who resides at Morristown, says in that paper: 'Sand-flats of Jersey!' Jersey, whose agricultural products are worth more to the acre than those of any other State in the Union. Jersey, whose cranberries, strawberries, peaches, pears, plums, blackberries and grapes make the mouths of the people of the two great cities of New York and Philadelphia water from early spring to late autumn. Jersey, whose mineral resources are among the most valuable in the land; whose lofty wood-covered hills and splendid forests of pine in the south, and oak, chestnut and beech in the north are the envy of all foreigners who see them. Jersey, whose boundaries are the magnificent Hudson and the broad and majestic Delaware. Jersey, whose seacoast is the longest in proportion to its area and the most famous strip, except that of Massachusetts, from Flordia to Maine. Jersey, whose northern lakes are worthy to be compared with Chautauqua, and one—Hopatcong,—taking its surroundings into account, not inferior to any of the smaller lakes of America. Jersey, with Princeton University, the Stevens Institute, Rutgers College, Drew Theological Seminary, Pennington and Hackettstown, and the two finest lunatic asylums in America, to be spoken of as

'sand-flats.' Where has our contemporary lived? If he will visit the editor of this paper, at Morristown, we will open to him a new world and cause him, temporarily, to regret that fate ordered him to live elsewhere. Sand-flats, indeed!"

The surface of the State is varied; the southern counties are comparatively level; the intermediate section, rolling, inclined to hilly; the northern, hilly to mountainous. The mountainous regions are growing in popularity as summer resorts—cool, picturesque, healthful.

Mr. Will Bogart Hunter writes of Lake Hopatcong and the region surrounding it, as published in the Newark *Sunday News,* April 21st, 1901, as follows:

"About none of the lakes of the continent or of the world that is called New is there more of history, more of romance, more of song. Created by the Great Glacier, its rugged shores tell to the student the story of the formation of the world.

"Here the red man builded his home before the India-seeking ships of Spain turned westward from Palos. He it was who gave to it its musical name and who christened the mountains and the valleys and the singing streams.

"Within an hour's journey, in mountain fastnesses just like these, the tattered remnant of the army of freedom beat back the red-coats of England. Among these same hills iron was first made in the new world to be hurled from American guns against the hosts of Britain."

Such is the story of one New Jersey lake. The others are no less interesting in historic association.

In Morris, Sussex and Warren counties more lake beauty can be found than in almost any State in the Union. Within their borders are more than fifty lakes, nestling and hiding away in the mountains. About their shores are 200,000 acres of virgin forest.

Hundreds of visitors seek these picturesque parts and idle away the long summer days in the cool shade of hemlock and pine. Yet it can never be said of the lakes that they are overcrowded.

A tired city man can fish or loaf and smoke on the shores

of a Northern New Jersey lake and see not a soul from morning till night.

Or, if he wants society instead of solitude, he can find it within easy walking distance.

New Jersey's lakes are so many and so profuse in the attractions they hold out to visitors that they can take good care of all who go to see them. They appeal to the fisherman. to the man trying to forget, to the mountain climber and above all to the nature lover.

Men and women come from all corners of America to find pleasant vacations beside the placid waters of Morris, Sussex and Warren.

The long stretch of seaside, bordering the entire eastern coast of the State from Sandy Hook to Cape May, is famous the world over for its facilities for summer sea-bathing, recreation, rest and health. The multitudes of people who annually visit the sections named add largely to our consuming population, and thus a nearby market is afforded for farmers, market gardeners and milk and poultry producers.

Further exceptional markets are the great cities—New York and Philadelphia.

And the State itself, in the density of its population per square mile, is third as compared with other States in the Union.

Are these markets easy of access? No State in the Union has a better system of hard roads, and no other has such a network of railroads. (See article on Transportation Facilities.)

We are quite sure that New Jersey, situated, as it is, between the cities named, affords an exceptional opportunity for young men and young women of energy and purpose for success in agricultural work.

Farms in good condition and lands for colonization purposes may be secured at very reasonable prices, so that it is not necessary for intelligent home-seekers to bury themselves in regions remote from the seaboard, remote from schools, churches, social and other advantages in the newer West and South.

Any one who is willing to work and who will work intelligently any of New Jersey's productive soils, need not suffer for the good things of this life in their season. And a judicious expenditure of labor and capital will be rewarded with a reasonable profit.

Climatic conditions maintain an equilibrium that is conducive to health, both in summer and in winter. Our summer resorts are winter sanitariums as well. Atlantic City, Cape May and Lakewood in the Pines are notable examples. (For climatic conditions in detail, see article by Professor E. W. McGann.)

FRUIT INDUSTRY.

Peaches. While peaches are produced in nearly all parts of the State and are quite generally grown for local market or home use, the sections devoted to the business, as a market industry, are chiefly in the northwestern part of the State. This particular division would be marked by a line beginning north of Trenton, thence to Summit, Caldwell, Pompton and Ringwood; of this section Sussex and Hunterdon counties lead. A conservative estimate places the value of the crop of 1900 at $1,100,000, although dry weather reduced the yield and value materially.

Apples are produced in most farms, but are more profitably grown in the northern half of the State above Trenton and in the western part of Burlington and Gloucester counties.

Pears. Monmouth, Camden and parts of Burlington and Gloucester grow immense quantities of pears. These are the chief market sections. This fruit, however, is an easy grower in most localities where apples and peaches flourish.

Strawberries, Raspberries and Blackberries are encouraged to profitable production wherever a nearby market is found, but the large commercial acreage of these fruits is in the counties of Cumberland, Atlantic and Salem.

Cranberries. The large plantations of this healthful fruit are chiefly within Ocean and (eastern) Burlington counties. The natural requirements of this plant of suitable soil and

sufficient water must be met, and, where nature has not provided them, the grower must create them. The business requires careful management.

Grapes are extensively grown in Atlantic county, parts of Cape May and Cumberland. The unfermented juice of the grape, as put up at Vineland, Cumberland county, has an extensive market. In a recent year in the vicinity of Egg Harbor, Atlantic county, 35,000 gallons of wine were manufactured, and in 1892 100,000 gallons.

A conservative estimate of the areas devoted to small fruits in Hammonton, Atlantic county, and vicinity is: Blackberries, 27,000 acres; strawberries, 900 acres; raspberries, 800 acres; grapes, 400 acres; peaches, 200 acres; cranberries, 300 acres—over 5,000 acres in that one locality. There are also large acreages in the townships of Galloway, Mullica, Hamilton and Egg Harbor.

Plum-culture is increasing and many tons are annually put on the market in our fruit-growing sections.

Cherries, too, are a profitable crop, and are grown on most fruit soils. One farmer in the vicinity of Newark, who produces them with other fruit for market, sold at a very profitable price 120,000 pounds of this fruit in a single season.

Currants also grow well, and have a good market.

Huckleberries grow spontaneously in the wooded areas of the State, especially in the southern part, where forest trees are not so tall as to prevent their development. Millions of quarts of this fruit are annually gathered and marketed, and are a source of profit to owners and pickers.

POULTRY.

The lighter or sandy soils of New Jersey furnish ideal natural conditions for the poultry business. Porous, always clean, soon dry after rain, with a climate, in the southern part of the State especially, comparatively mild, and fine markets, no better location exists; and the business is large and growing.

The census of 1890 gives the State in round numbers 3,000,000 chickens; other fowls, 300,000, with an annual production of eggs in excess of 8,000,000 dozen.

WHITE AND SWEET POTATOES.

White potatoes are a staple crop in many counties of the State. The acreage in 1900 was 48,435, with a total yield of 3,342,015 bushels. But 1900 was a very unfavorable year for this crop. With favoring weather the crop reaches 4,250,000 bushels. Total value of crop for same year, at 69 cents per bushel, was $3,342,015. (Report United States Department of Agriculture, 1900.)

The sweet potato is grown for market chiefly in the southern counties; Gloucester county producing more than any other. The annual yield in round numbers is 2,500,000 bushels.

TRUCK FARMING.

If we were asked to separate the agricultural interests of the State into three divisions they would be dairying, truck and fruit farming and poultry. Truck farming in New Jersey, owing to its proximity to large consuming populations, is immense, and a large proportion of the yearly product is conveyed to market by the farmers' teams in his own truck wagon. During summer and autumn fifteen hundred teams, loaded with New Jersey fruit and produce, cross the Camden and Gloucester ferries daily into Philadelphia, and a similar traffic prevails in the neighborhood of New York City, Jersey City and Newark. Gloucester, Cumberland and Burlington counties devote large acreages to the production of watermelons and cantaloupes, or muskmelons, of fine quality.

Being brought to perfection before shipping, their texture and flavor exceeds that of those brought to our northern markets from the far South. And the Hackensack muskmelons have a reputation for richness not surpassed by the far-distant Colorado fruit.

MARKET GARDENING.

Market gardening is a still more intensive form of crop production than truck farming, as the latter is than general farming. In this several crops are grown on the same area in a single year. Although this form of intensive farming involves much more labor and expense per acre, and a more exact experience, coupled with intelligent managment, the profits are correspondingly larger. As compared with general farming, the returns from the two branches named are as five to one at least.

The growth of Philadelphia has made much of the land adjacent thereto too valuable to be used for gardening, and many of the small truckers from the Pennsylvania side have moved to New Jersey, where they secured land at lower rent, with a soil better adapted to their business.

The great system of New Jersey's macadam roads has extended the area of market gardening from twelve to fifteen miles from the cities, and land can be obtained at low prices in good localities, where every facility is afforded to enable an enterprising man to secure a good home and make truck farming profitable. Land that has long been used only for general farming responds readily to the liberal use of fertilizers, and the culture required to raise market garden crops and some of the results from such cheap farms have been remarkable. Within short distances of railroad stations, within the lines of free mail delivery and from twelve to fifteen miles from Philadelphia land can be bought from $40 to $75 per acre. Produce can be shipped to New York by rail or easily carted to Philadelphia. Relatively the same conditions prevail in the neighborhood of New York City and the cities of New Jersey northward from Elizabeth.

FLORICULTURE, SEED FARMS, NURSERIES.

In commercial floriculture New Jersey, situated, as it is, between New York and Philadelphia city markets, makes the largest showing of any State in the Union in proportion to its

size. The figures of census of 1900 not being available at this writing, we give those of 1890:

Of florists' establishments we have 368; owned and managed by women, 8. Total square feet of glass, 3,703,554.

Total value of establishments	$3,666,518 46
Total value of tools and implements	155,107 14

In these are propagated:

Roses	1,808,014
Hardy plants	4,006,602
All other plants	12,912,114
Total	22,726,730
Plants sold, value	$897,908 58
Cut flowers sold, value	1,288,478 56
Total value	$2,186,387 14

Of seed farms the State has thirty-four, comprising an acreage of 6,272.

Total value of farms implements and buildings	$2,333,066 68

Farms devoted to the nursery business number 145, with a total acreage of 5,465.

Total value of nurseries	$1,712,464 75
Total capital invested	1,970,593 90

THE DAIRY.

While, in a general way, dairying is carried on throughout the entire State, every farmer having some cows, the industry, commercially, is restricted to certain sections, and these are divided into two classes—those that cater to a local trade in our towns and cities, and those who ship the product to distant markets by railroad or dispose of it in co-operative or other nearby creameries.

The location of the larger towns and cities, as laid down on

OTT'S ALDERNEY DAIRIES
SANITARY INSPECTION

the map of the State, will indicate the districts and markets of the first-named class. The latter, those who sell to the creameries and in distant markets, shipping by railroad, are chiefly in the western part of the State. If sold at 2½ cents per quart, this industry gives a return to the dairymen of the State of nearly $9,000,000 annually. But all milk sold from the dairyman's wagon and much of that that is produced in our larger commercial dairies is sold at from 6 to 8 cents per quart. Could we have exact returns from all these, the total sum would be much larger than that given. The industry is increasing in the State from year to year.

MIXED FARMING.

Having specified, briefly, the special agricultural and horticultural opportunities existing in the State, it should be said that the majority of farmers practice, to a greater or less extent, a mixed husbandry. With such a variety of soils available, diversity of production is easily possible, and, for the average farmer possessing limited means and limited experience and knowledge, this, usually, is the safer course to follow.

Special branches—unless like dairying, which covers the entire year—if not properly managed, are liable to leave a portion of the year barren of returns. The study of every farmer should be to have something coming in every month in the year, for something must go out constantly for maintenance. A line of the special industries, if desired, can be chosen, so as to obviate the barrenness indicated. Whatever line of work is decided upon should govern, somewhat, the character of the soil and location to be chosen—having always an eye for the best market for the crop to be produced.

The map published with this manual will be of much assistance in guiding settlers to a location suited to their purpose. A person unacquainted with a (to him) new locality, will also find that a visit of inspection, during the growing season, to a neighborhood in which he thinks of locating, will be of great

advantage to him in determining as to the character of the soils and the crops and varieties that are the most profitable there.

CROP AND STOCK VALUES.

Excluding from our estimate land values, buildings, fences and machinery, all fruit crops, market garden and truck farming crops, and sweet potatoes, poultry, eggs, pork, lambs and wool, the following table shows the gross total value of horses, mules, cattle and sheep, with the earnings of the dairies, and the crops of wheat, corn, rye, oats, buckwheat, hay and white potatoes produced in New Jersey in 1900, with also the number and value of farm animals. These figures are made up from reports of Secretaries of County Boards and other prominent farmers throughout the State.

TABLE I.

Crops.	Acreage.	Average yield per acre.	Production, Bushels	Average farm price per bu. Dec. 1st.	Farm value Dec. 1st.
Corn	257,364	33	8,493,012	$0 46	$3,906,785
Wheat	122,753	22	2,700,566	74	1,998,418
Rye	64,717	18	1,164,906	55	640,698
Oats	95,003	29.6	2,812,089	31	871,747
Buckwheat	10,005	16	160,080	59	94,447
Hay	396,113	1¼ tons	495,141 tons.	16 00	7,922,256
W. Potatoes	48,435	69 bu.	3,312,015 bu.	60	2,005,209
S. Potatoes		173 bu.	2,500,000 bu.	56	1,300,000
Total value.					$18,739,560

Stock.	Numbers Jan. 1, 1901.	Average price per head.	Values.
Horses	79,972	$95 00	$7,597,340
Mules	7,196	105 00	755,580
Milch Cows	223,261	40 00	8,930,440
Other cattle	39,896	32 00	1,276,672
Sheep	42,722	4 60	196,521
Total value			18,756,553
Assuming that the annual product per cow is 1,600 quarts, and making the average price 2½ cents per quart, would give 357,217,600 quarts, value			8,930,440
Total value of the above crops for the State			$46,426,553

Harvesting Potatoes Monmouth County.

From United States Department Agriculture Crop Report for 1901, Division of Statistics, Hon. John Hyde, Statistician, the following figures are given:

Crops.	Acreage.	Average yield per acre.	Production, Bushels.	Aversge farm price per bu. Dec. 1st.	Farm value Dec. 1st.
Corn	257,364	33	8,493,012	$0 45	$3,821,855
Wheat	122,753	19.1	2,344,582	74	1,734,991
Rye	64,717	15.9	1,029,000	55	565,950
Oats	95,003	29.6	2,812,089	31	871,748
Buckwheat	10,005	16	160,080	59	94,487
Hay	396,113	1.26	499,102	16 05	8,010,587
W. Potatoes	48,435	69	3,342,015	60	2 005,209
Total value					$17,104,827

OUTLINE OF COUNTY HISTORY, SOILS AND PRODUCTS.

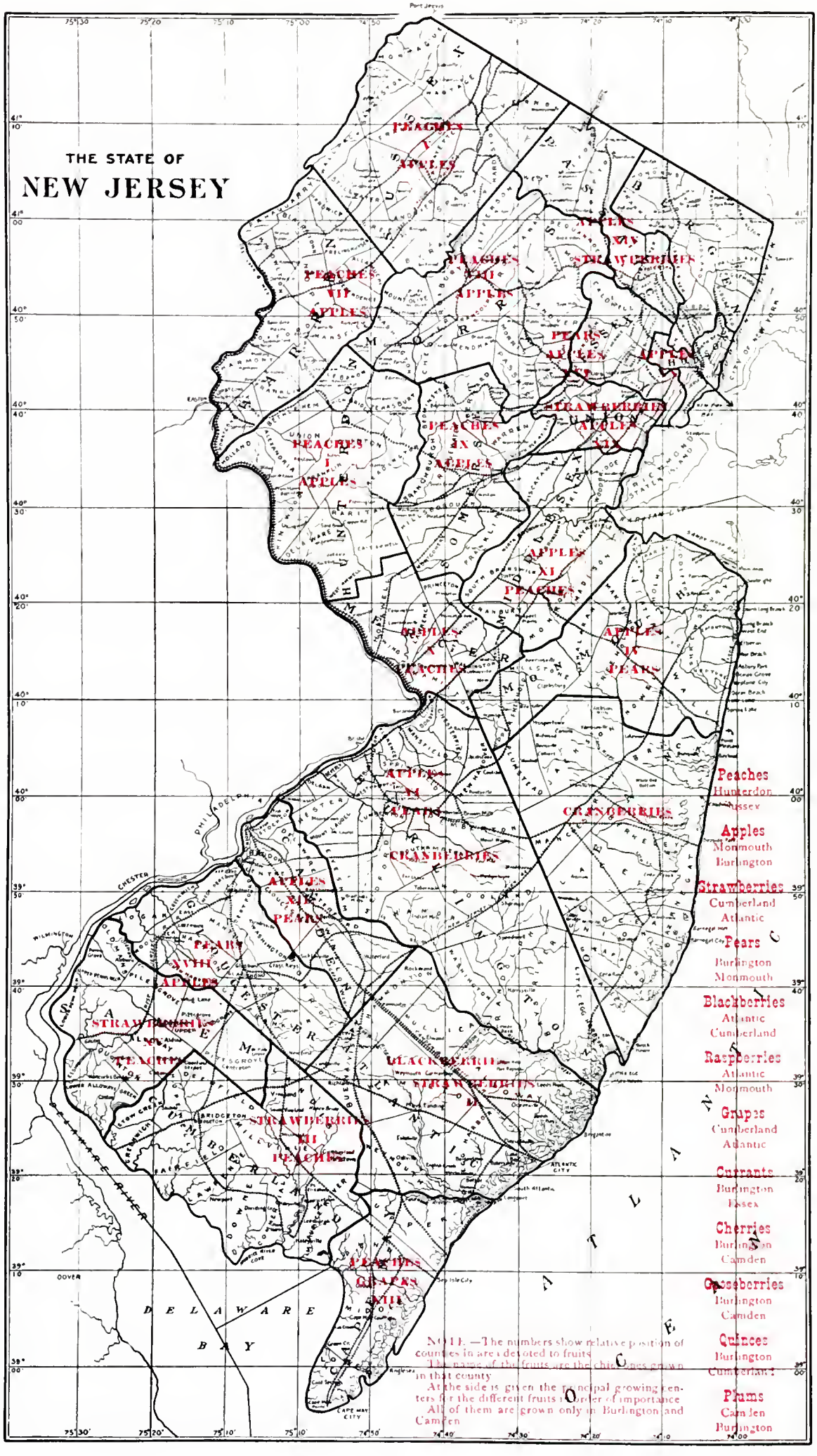
ATLANTIC COUNTY.

This county was formed from the eastern part of Gloucester in 1837, and is about thirty miles long by twenty wide. Several navigable streams run through the county. Clams, oysters and fish abound in the bays and inlets. Its coast line is dotted with a number of noted summer resorts, among them being Atlantic City, which has, within a few years, gained a national reputation.

A portion of the pine region of New Jersey formerly extended over most of this county, and agriculture was but little pursued in its earlier history. The seacoast towns, having sprung up, creating a demand for small fruits, vegetables and poultry products, thousands of acres have been cleared, which are occupied by a thrifty and industrious population, and parts of the once so-called sandy desert now affords a comfortable livelihood for willing workers.

Dairying, almost unknown in this county a few decades ago, is increasing, but is unable to supply the demands in the summer season, and the popular resorts continue to receive milk from more distant points. Poultry-raising is also increasing. The demand for spring chickens and fresh-laid eggs affords a good market at the very doors of producers.

Grape-culture has for years been extensively followed, and many thousand gallons of excellent wine are made annually, besides the large quantity of grapes sold. Here, also, berries of different kinds flourish. Strawberries, perhaps, lead, yet raspberries and blackberries are grown in large quantities for the home and city markets. The cranberry, in some locali-


THE STATE OF
NEW JERSEY
PEACHES V APPLES
PEACHES VII APPLES
PEACHES VIII APPLES
APPLES XVI STRAWBERRIES
PEARS APPLES
APPLES
STRAWBERRIES APPLES VI
PEACHES IX APPLES
PEACHES I APPLES
APPLES XI PEACHES
APPLES X PEACHES
APPLES IV PEARS
APPLES M CRANBERRIES
CRANBERRIES
APPLES XII PEARS
PEARS XVIII APPLES
STRAWBERRIES
BLACKBERRIES STRAWBERRIES
STRAWBERRIES III PEACHES
PEACHES GRAPES XIII
Peaches
Hunterdon
Sussex
Apples
Monmouth
Burlington
Strawberries
Cumberland
Atlantic
Pears
Burlington
Monmouth
Blackberries
Atlantic
Cumberland
Raspberries
Atlantic
Monmouth
Grapes
Cumberland
Atlantic
Currants
Burlington
Essex
Cherries
Burlington
Camden
Gooseberries
Burlington
Camden
Quinces
Burlington
Cumberland
Plums
Camden
Burlington
NOTE.—The numbers show relative position of counties in area devoted to fruits.
The name of the fruits are the chief ones grown in that county.
At the side is given the principal growing centers for the different fruits in order of importance.
All of them are grown only in Burlington and Camden
DELAWARE BAY
ATLANTIC OCEAN
DELAWARE RIVER

is extensively practiced, and a few acres often return more money than large farms. The eastern part of the county is a sandy plain, covered largely with pine and scrub oak; the soil is light and of little value for strictly agricultural purposes. Large deposits of superior quality of clay are here found, suitable for ornamental brick and terra-cotta work.

In the midst of these sandy and pine barrens are located many thousands of acres of valuable cranberry bogs, which, in the past few years, have proved to be a profitable department of fruit-raising, the berries being in large demand in all parts of the middle West and in California. This industry has made this pine district more valuable than some of the highly-cultivated farms that lie a short distance therefrom.

CAMDEN COUNTY.

This county was formed in 1844 from the northeastern portion of Gloucester. Its proximity to the city of Philadelphia and the large and growing city of Camden, where some of the largest ship-building plants of this country are locating, makes it, naturally, a desirable location for market gardening and truck farming.

As though foreseeing both the large consuming population and the crops suited to their needs that would later be needed, and that could be better grown nearby and marketed in a much fresher and better condition for that reason, nature placed a soil of sandy texture along the Delaware river border of this entire county, so that the market gardener and trucker finds a soil adapted to the production of early and quick-growing crops ready at hand.

The southeastern part of this county, also, has a soil suitable for such crops, and the quantities of produce carted to the markets named by the farmers' teams is very great. Wagons are constructed especially for this purpose, and over the fine stone roads that traverse the county loads are carried four and five times as weighty as was possible to do under former conditions. This possibility is a great annual saving in cost of cartage, fewer men and teams being required.

In the vicinity of Haddonfield the soil is well adapted for the grains and grasses, and dairying is followed extensively with other branches. Some fine herds of the best dairy breeds are located in this vicinity. With such markets at the very door of the farmer, he need not fear of having a quick and steady demand for his products, if he grows a first-class article. This should be the aim of every man who engages in any branch of the varied business of agriculture.

CAPE MAY COUNTY.

This county is the most southern limit of the State. It derives its name from Cornelius Jacobesen Mey, who, in 1621, explored the coast and gave this cape his own name. It was organized a county by proprietary law in 1692, and by act of 1710 its bounds were definitely fixed.

The soil is mostly sand and sandy loam, and, where the latter is found, agriculture has, during recent years, made commendable advancement. Grain crops are not grown extensively, but forage crops, as crimson clover, cow peas and the millets, do well, and are grown for dairy and soiling purposes. Much of the soil is well adapted to market gardening crops, and, with nearby markets and good transportation facilities to those of Philadelphia and other cities, this county, with its cheap lands, presents an inviting field for new settlers.

The conditions of the Jewish colony, located in this county, are set forth in another article, to which the reader is referred.

Cape May City has long been known as one of the oldest and most popular summer resorts in the United States. Situated upon the peninsula and almost surrounded by water gives it superior advantages for ocean view, delightful sea breezes and bathing.

Along the coast are numerous towns, all populated largely by visitors from the cities, who enjoy the summer sports of bathing, boating and fishing, the facilities for which are unsurpassed.

CUMBERLAND COUNTY.

This county formed a part of Salem until 1747, and was named in honor of the Duke of Cumberland. It is situated in the central-southern part of the State. It was settled in the early history of the State, about 1732, several families locating at Deerfield, and, in 1737, a Presbyterian church was erected. In 1775 a company of soldiers was formed at Bridgeton, marched north and joined the army of General Schuyler, of Revolutionary fame.

The surface of the county is comparatively level; soil of alluvial formation, generally sandy loam, with some clay. Along the Delaware bay is a large tract of marshy land, the northeastern part being covered with pine and small oak.

Agriculture has, from the first settlement of the county, been one of the leading occupations. The farmers are progressive, ready to change from the old methods, if better and more successful are assured.

The cereals, as corn, wheat and oats, grow well on the heavier soils, and, on the light sand, sweet potatoes, tomatoes, early peas and other vegetables are grown extensively. Several canning establishments have been operated for some years, affording a reliable and profitable market for tomato-growers.

The production of small fruits and berries of different kinds is increasing. Here the delicious strawberry attains perfection; thousands of crates are often sent daily to various markets, and, from the large centers, distributed to the smaller towns in this and other States. The raspberry and blackberry are cultivated extensively. Huckleberries grow wild and without any effort on the part of the landowner, except gathering and marketing. Grapes abound, and many acres, formerly uncultivated, are now producing grapes and wine abundantly. Watermelons and cantaloupes are market crops in some parts of the county. Dairying is extensively practiced, milk that is not consumed in the county being shipped to Philadelphia and the coast resorts.

Bridgeton, Millville and Vineland are large, thriving towns. Some of the leading glass works in the country are located at these points, which, with other manufactories in the county, employ large numbers of men and women, who consume much that is grown in the surrounding district.

GENERAL HISTORICAL SKETCH OF BERGEN, PASSAIC AND HUDSON COUNTIES.*

The territory comprising old Bergen and Passaic counties has been variously marked by its lines of civil division. Its eastern border, along the Hudson, constituted the first organized municipality in East Jersey, having been incorporated as the town of Bergen in 1658. In 1664 the township of Bergen, comprising the present county of Hudson, east of the Hackensack river, was added to it.

In 1682 the county of Bergen was erected, and included the territory east of the Hackensack from the Kill von Kull to the State line. In 1710 the county of Bergen was enlarged, and from that time till 1837, when Passaic county was set off, it included the latter, with the exception of the small part southward of the Passaic (taken from Essex), and the county of Hudson, which was set off and erected into a separate county in 1840.

During the two hundred years and upwards which preceded the last division of Bergen, while her ancient domain was yet intact, many of her most important historical events occurred. While we do not underrate the marvelous progress of the last half century, which has literally transformed the face of the whole country in a great variety of respects, yet in history that which is most ancient is most interesting. We cease to wonder at the marvels of modern phenomena because of their very abundance and familiarity, but the "forgotten lore of bygone ages" excites in the mind of the student an ever-new and fresh delight.

*In part from Clayton & Nelson's History of Bergen and Passaic Counties, 1882.

Bergen, in her old undivided status, passed through the phases of colonization and civil rule under the Dutch of New Netherland, with which her beginning as a settlement was practically contemporaneous; through the transition to an English colony and the government of the Proprietors of East Jersey; through the exciting scenes of the early Indian wars, the period of colonial authority under the kings of England, and the stirring events of the struggle for independence. She passed through the formative period of the State and the Nation, the subsequent war with Great Britain, and held her territory undivided for a quarter of a century after those great events had occurred.

That portion now included in Hudson county was, in many respects, the theatre of the most important events, so far as the people of Bergen were concerned. It was the earliest settled and the nearest the center of the most important operations of early as well as of modern times.

This section, in its commercial and manufacturing importance, is second to no other district of equal extent in the State. Every year adds to it greater population, greater commercial value, and increased facilities for connecting the vastly-accumulating business of the great West with New York City, and the great warehouses for western-bound goods arriving from Europe on the New Jersey side of the Hudson must, more and more, be located here.

BERGEN COUNTY.

This county was erected in 1682, and comprised parts of Passaic and Hudson. On the west, mountainous, and on the east, along the Hudson river, the world-famed Palisades. This county is dotted over with towns, some of which are adjacent to and overlooking this beautiful river. Located near New York, thousands having occupation in that great city have their homes here.

The soil in the valleys is very productive, in a high state of cultivation, and a line of market gardening is followed, the

products therefrom finding a good market at paying prices without cost of shipment.

In the northern sections of the county there is much land well adapted for all the early vegetables, small and large fruits and similar crops, which could be utilized in this way at a much larger profit than is obtained from the rotation crops, such as are produced in the West at much less expense than is possible here.

This is an inviting location to such as are inclined to truck farming.

Milk-production is receiving more attention than formerly. Improved conditions, better cows, more attention to sanitary condition of stables and intelligent feeding make it a profitable business, where, as here, it is delivered to customers by the producer.

The good railroad facilities to all parts of the county, the Palisades along the eastern border and the Ramapo mountains in the northern section make it an ideal location for the home of either farmer, artisan or the retired millionaire.

PASSAIC COUNTY.

This county was formed from the northern part of Essex and western part of Bergen counties in 1837. The surface is generally hilly, with broad, fertile valleys, except the extreme southeast, where it is level.

It is well-watered by the Passaic, Ramapo and other rivers, which not only fertilize the valleys, but are of the utmost value for water-supply and drainage to the numerous cities along their course.

In the northern part large deposits of valuable iron ore are found and extensively used in the numerous forges of that region. It derives its chief importance from its extensive manufactories located at Paterson, Passaic and other places. These are extensive and require a local population that must be fed. Tillers of the soil, even more than they now do, should take advantage of this need and supply it with fresh products of

the farm, market garden, dairy and poultry yard, and not make it necessary for them to draw upon remote producers for these necessities as they are sent to the New York market. If the branches of agriculture practiced in this county are chosen with reference to the market demands, and first-class products grown, no better situation for enterprising farmers need be sought.

Dairying is a growing industry in the numerous valleys, which afford abundant pasturage of excellent quality, and the demand for good milk increases with the population. Fruits of all standard varieties are grown abundantly, with a quality unsurpassed. Market gardening is profitably engaged in; the deep soil in the valleys being well adapted for this purpose.

Numerous lakes, fed by mountain springs; the varied scenery, from hilltop or mountain summit; the beautiful valleys, under varied cultivation, make it an ideal summer location for the care-worn city man, thousands of whom are now availing themselves of its enjoyments.

HUDSON COUNTY.

This county was formed from the southern part of Bergen county in 1840, and is the smallest county in the State, containing only about seventy-five square miles. While small in area, it is second in wealth. In 1900 the valuation was $169,127,800, a gain over the preceding year of $7,133,500, which is a greater increase than any county in the State. Situated directly opposite America's great commercial city and possessing almost equal water facilities for the largest ocean steamers, many of the trans-Atlantic and other lines sail from Jersey City and Hoboken, where better communication is made with the Great Trunk Line railroads.

Here the Pennsylvania, Baltimore and Ohio, New Jersey Central, Lehigh Valley, Lackawanna and Erie systems have their terminals, and the larger part of the export and import commercial traffic of the United States passes through Hud-

Passaic Avenue, Hudson County. (Before Improvement.)

Passaic Avenue, Hudson County. (After Improvement.) Showing deep cutting 20 feet wide. Telford, 10 inches. Macadam, 8 inches.

son's gateway to points of distribution throughout the country and the world.

This is also the second county in population. Thousands who are employed in the metropolis have homes in its various towns, which are easily reached by steam or trolley roads.

Owing to the limited amount of land unoccupied by buildings, general lines of agriculture are not followed; but, where vacant lands are found, these are tilled by the market gardener, who often produces several crops from the same ground in a single season. The greenhouse industry is also extensive, a large amount of capital being invested and the most modern systems are used. The location being at a market where there is always a demand, insures paying, and, at times, fabulous, prices for crops produced. For these reasons Hudson county affords special advantages to horticulturists engaged in this particular work.

ESSEX COUNTY.

This county was formed in 1675, and was originally larger in area. It is now the most populous and wealthy county in the State. Like other counties near the city of New York, it is covered with cities and towns. Newark, the largest city in the State, is noted for its manufacturing industries.

The northern part of the county is hilly, almost mountainous, yet these are covered with beautiful towns containing handsome residences of wealthy people, who prefer this charming section to city homes. In 1900 the taxable value of Essex county real estate was $174,505,800, with a total valuation of property taxed $210,806,300. Owing to the high value of land, general farming is practiced but little.

Dairying, however, is a leading feature in the western part of the county, and there are but few, if any, sections in the State where more cows are kept on a limited acreage than here. A demand for pure, good milk from healthy cows and cleanly surroundings has led many to improve their methods and stables, to the advantage of producer and consumer. The Fairfield Dairy, near Caldwell, with others in the county, are

worthy of inspection by all students of the dairy business. Fifty men, five hundred cows and six hundred acres of land, with the necessary teams and dairy appliances, constitute the working force of the former. It is, in all of its appointments, one of the leading dairies in the United States.

Market gardening is carried on to the highest perfection, producing, in some instances, three or more crops a year. The convenience of excellent home markets that consume all perishable products are advantages possessed by those only who are located near them. Fruits, both standard and the smaller kinds, grow well. Strawberries are grown in the vicinity of Newark to a high state of perfection, and bring the highest price in the Newark and New York markets, while vegetables, under the high cultivation given, produce enormously. If one desires to live in close touch with metropolitan advantages, while, at same time, enjoying the pleasures of a rural home, Essex county can furnish many desirable locations.

GLOUCESTER COUNTY.

This county was laid out in 1694, and the boundaries definitely fixed in 1710. It is of alluvial formation, and, in different parts, vegetable deposits and sea-shells have been found many feet below the surface, which is slightly undulating. The soil is generally an admixture of clay and sand, very fertile, producing grain, grass, fruit and vegetables in abundance.

Dairying has received more attention during the last few years than formerly, but is not a leading industry. Its proximity to the large cities of Camden and Philadelphia, with the adaptability of the soil for trucking and market gardening purposes, has made this line of agriculture more profitable than any other.

Here the sweet potato is grown to perfection, both in quantity and quality, and is a staple crop, this county producing about half the total yield of the State. Formerly stable manure, in large quantities, was used for growing this crop,

Packing Sweet Potatoes, Gloucester County

but, in recent years, humus is obtained by green manuring and using commercial fertilizers prepared especially for it. During the harvesting season as many as eighteen carloads in a single day are frequently sent from Swedesboro station, besides large quantities from other points, which are shipped to the northern and western States.

White potatoes of early varieties are also extensively grown; the warm, sandy soil permits early planting and hastens maturity. The same conditions also favor tomato-growing; the plants being started in hot-beds, are ready for transplanting early in the season, and, under high cultivation, begin bearing before the general markets are overstocked. A difference of one week in time of ripening will often materially affect the money returns to the grower.

Melons are also largely grown, and the crop is increasing in favor. Vegetables of all the standard kinds and small fruits are extensively grown for the nearby markets, most of which is hauled in wagons to Camden and Philadelphia. To those who prefer this line of farming, with the superior advantages afforded, this county offers special inducements.

HUNTERDON COUNTY.

Hunterdon, named after Governor Hunter, was set off from Burlington in 1713. Originally it comprised portions of what are now the counties of Warren, Sussex, Morris and Mercer. It is somewhat diversified with hills, table-lands and broad valleys. The Musconetcong mountains extend nearly across the northern part, and, with several distinct spurs, are sources of many never-failing streams that furnish abundant water-power.

There is a great variety of soil; the southern part, along Sourland mountain, is cold, clayey and rocky; north of this narrow strip is a beautiful, highly cultivated, rolling country, principally red shale from one to six feet below the surface, while in the more northern is the well-known limestone section.

This, like other counties in the center of the State, is largely interested in milk-production. The railroads in the northern and eastern sections carry large quantities daily to New York. Several creameries are located in its bounds, making large amounts of butter, and, being of superior quality, finds a ready market at good prices.

Much attention has been given, in former years, to raising horses. Types were selected by breeders that suited the market for size, style and speed. Perhaps no county has produced more or finer specimens of this noble animal than Hunterdon.

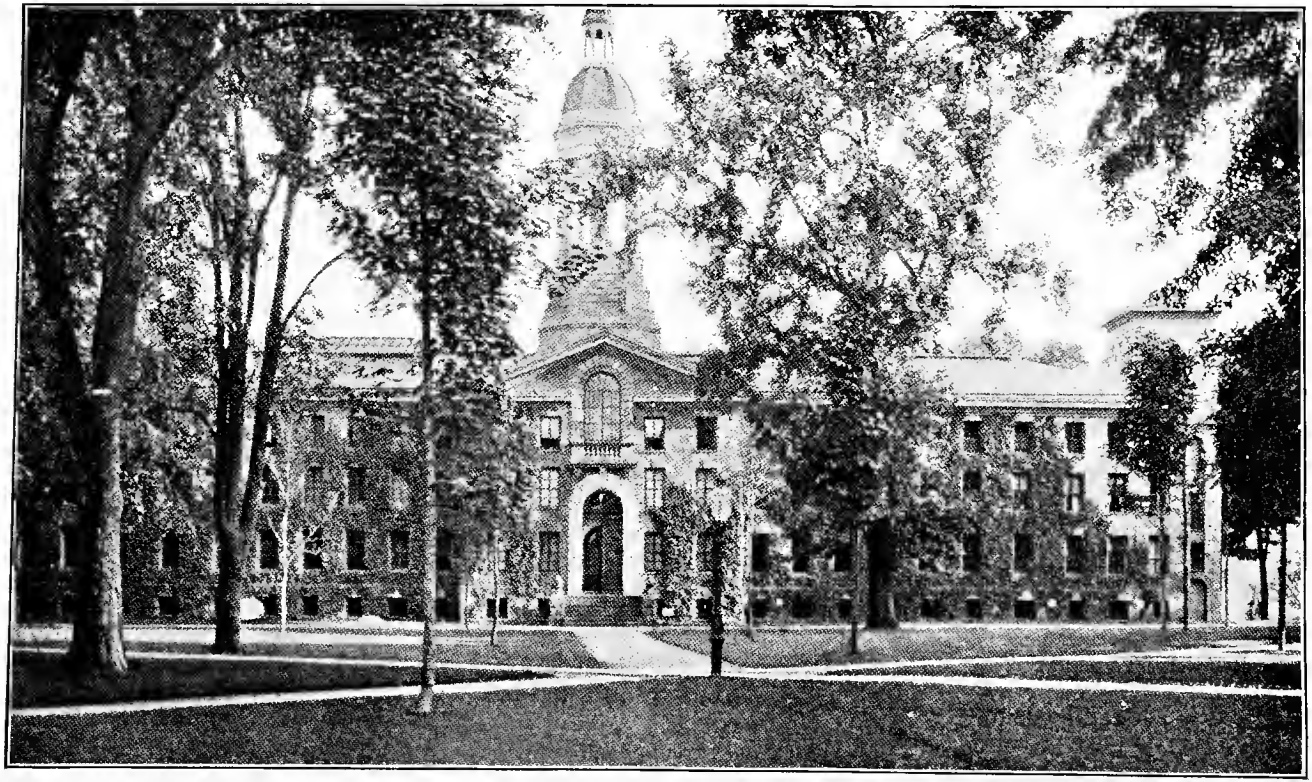
Sheep-raising has also been prominent, particularly raising early lambs for market. Many of these go to the shambles in February and fancy prices are realized.

For many years this has been the banner county for peach-production. So extensive has this branch become that two exchanges were formed, one at Flemington and the other at Pittstown. Through these agencies the bulk of the crop has been sold, and more satisfactory returns obtained than when forwarded to commission houses in the cities. Apples, pears and all standard fruits abound, and, frequently, where the land is too rough for cultivation, the hardier fruits grow luxuriantly.

The people are intelligent, industrious and progressive. Many of the farmers have, for years, been interested in the agricultural organizations, from which they have derived great advantages, both intellectually and financially. The hills, covered with fruit-laden orchards, and the valleys with flocks and herds, dotted here and there with attractive farm homes, present an inviting appearance to the home-seeker who has an eye both to profit and beautiful scenery.

MERCER COUNTY.

Mercer county was formed from the counties of Hunterdon, Burlington and Middlesex in 1838, and is about twenty miles long, with an average width of twelve miles. Within its



Princeton University, Nassau Hall.

bounds were fought two important battles of the Revolution, viz., Trenton and Princeton. It takes its name from General Mercer, who was killed at the latter. Hopewell was the headquarters of General Washington before the battle of Monmouth.

This county has, perhaps, better educational facilities than any in the State: Princeton University, located at Princeton; the State Normal and Model Schools, at Trenton; the John C. Green Foundation, at Lawrenceville; Pennington Seminary, at Pennington, and Peddie Institute, at Hightstown, all of which are liberally patronized, not only from New Jersey and other States, but also from foreign lands.

The State capitol is located at Trenton, as is also the county seat. This is a large manufacturing city, and, with the towns above mentioned, consumes a large part of the agricultural and horticultural products, thus a good home market is afforded and transportation expenses to other places avoided.

This county is well-watered, Stony brook and Assanpink creek, with their numerous branches, running through it and emptying into the Delaware river at Trenton. The country south of Princeton and Trenton is level, of an alluvial formation, soil light, but productive and well adapted to market gardening and fruits.

North, the surface is more undulating, with a variety of soil well adapted to the growing of summer and winter grain. Dairying is now extensively followed, and, owiug to convenient home markets, many retail the product, obtaining the highest price, thus receiving the entire profit. Others more distant have excellent shipping facilities and large quantities are sent daily to Philadelphia.

Three creameries are located within its bounds, which also afford additional market facilities.

There are three canning factories; these are built on the co-operative plan. Tomatoes are the chief product, and, being grown on the loamy soils, secure solidity and flavor, which gives them a reputation commanding the highest market price. While our entire State has special geographical advantages, being located between the large populous cities,

this county, with its adaptation for the various branches of agricultural and horticultural work, offers superior advantages for profit and educational facilities.

MIDDLESEX COUNTY.

This county was first formed in 1682, since which its boundaries have undergone considerable alteration. It is well-watered by the Raritan river and other streams. The surface is level or undulating; soil varies from light sand to heavy clay in the northern and eastern part; the southern, embracing Cranbury and Monroe townships especially, is a gravel loam of excellent combination for grain, grass, potatoes and fruits of all kinds.

The entire county is in close touch with excellent markets by means of numerous railroads and stone roads. Both the New York and the Camden and Amboy Divisions of the Pennsylvania Railroad system traverse the county its entire length. The State Agricultural College and the College Experiment Farm are in this county, located at New Brunswick, in connection with Rutgers College.

Dr. Edward B. Voorhees, the Director of the State and College Experiment Station and Professor of Agriculture in Rutgers College, resides on the College Farm. This farm is under his immediate supervision. Its model dairy, its succession of forage crops, its several farm crops, with the experimental plots of the State Entomologist, Dr. John B. Smith, and of the Professor of Botany and Horticulture, Dr. Byron D. Halsted, afford standing object-lessons for the farmers of the State and are very valuable to them.

To those who desire to engage in the production of the staple crops—corn, wheat, rye, oats, grass for hay, potatoes and fruit, this county can furnish the very best land for such crops.

Dairying is also assuming a place as a leading industry. Farmers are realizing that it is often more profitable to manufacture their grain and hay into milk and butter for a market

Cranbury Station Road, Middlesex County. (Before Improvement.)

Cranbury Station Road, Middlesex County. (After Improvement.)

crop, thus retaining the fertility value of their farm crops at home, instead of allowing this to go off the farm and be replaced by commercial fertilizers.

Historically, the county is interesting. It, with some of its neighboring counties, was the theatre of the contending forces during the protracted struggle of the war of the American Revolution. New Brunswick, the capital of the county, was occupied alternately by these forces as the one or the other succeeded in gaining possession.

The present Secretary of the New Jersey State Board of Agriculture is a native of this county, as were his parents and grandparents.

MONMOUTH COUNTY.

This county was first established in 1675, but its boundaries were not definitely fixed until 1714. It was originally settled, about 1664, by the Dutch, Scotch and some New Englanders. During the Revolutionary war it suffered severely; its easy access from New York made it a favorite resort of the Royalists for forage and plunder. Within its bounds was fought one of the most important battles of the Revolution, near Freehold, June 28th, 1778. This ground, so dear to all American citizens, is now owned by Hon. D. D. Denise, who for many years was President of the New Jersey State Board of Agriculture, and to whom it owes much for its present success.

Near the battle-field stands the old Tennent Church, still preserved as it was more than a hundred years ago, and noted for its history in connection with Reverends William and Gilbert Tennent and the strife for independence of that critical period.

There are several important towns and cities in this county, and, like other counties bordering on the seacoast, is thickly settled along the ocean front. Long Branch, one of the first popular seaside resorts, with Elberon, Ocean Grove and Asbury Park, have a wide reputation, and numerous others are coming into prominence year by year.

The surface of this county is level or slightly undulating. The soil, in a high state of cultivation, produces equal with the best counties in the State. Marl, a mineral fertilizer, abounds, and was extensively used years ago and advanced the agricultural productions to a high standard, which has not been lowered. Grain, grass, fruits and vegetables grow luxuriantly. The nature of the soil is especially adapted to growing potatoes, and thousands of barrels are shipped annually to New York and other markets.

The canning business is carried on quite extensively; at Freehold one firm uses the product of 1,400 acres, chiefly peas and Lima beans.

This county also leads in the growing of the Keiffer and other varieties of pears, yielding bountiful returns when intelligently handled. Dairying is increasing, the summer resorts consuming large quantities of milk.

Among the vegetables asparagus is an important crop—near the northern coast large areas are planted and the returns range from $200 to $500 per acre in favorable seasons. Tomatoes are largely grown, both for shipping and canning. The nature of the soil produces a superior quality, which commands the highest price.

The possibilities of this and other counties cannot be determined. With a class of intelligent, progressive farmers, ready for advancement along new lines that promise well, Monmouth will continue to be one of the prominent agricultural counties of the State.

MORRIS COUNTY.

This county was set off from Hunterdon in the year 1739. It originally included Sussex and Warren. It was named after Lewis Morris, Governor of the Province at that time. The northern and western portion is mountainous, the remaining generally level or undulating.

It is well-watered by the Passaic river, with its tributaries, and the north branch of the Raritan. Within its bounds are several large and thriving towns, also handsome suburban

KEIFFER PEAR ORCHARD, D. D. Denise, Monmouth County.
496 bushels to the acre.

places, where many of large wealth have settled, especially along the high ridges, where land that, half a century ago, was almost worthless, is now, for this reason, most valuable. It also has large iron manufactories, the abundance and quality of the ore and its accessibility to markets have induced many interested in metal industries to locate here.

At Morristown, the county seat, the American army, under General Washington, had its winter headquarters, and, in recent years, an association has been formed which purchased the house and land adjoining that it may be preserved for its historic interest. Many interesting relics of colonial days and revolutionary times are here preserved.

This county, like others located at convenient distance from city markets and also having a large suburban population, is largely engaged in dairying, which is on the increase. Cereal crops are grown to some extent, especially those that can be used as dairy foods.

Fruits of standard varieties have for many years been grown and attained a high state of perfection. The peach finds here a soil adapted to its wants.

The growing of plants and flowers is carried on extensively. Thousands of dollars are invested in greenhouses, and some of the largest and most modern buildings in the State, for commercial purposes, are within its bounds.

To those who desire a home near the metropolis and who enjoy natural scenery found only among the hills, superior advantages are here afforded.

OCEAN COUNTY.

This county was formed from the southern part of Monmouth in 1850; located along the Atlantic coast, upon which it has a frontage of thirty-six miles, with a long, narrow beach, separated from the mainland by Barnegat bay, which has made it a desirable location for summer residents.

Numerous towns and popular resorts are scattered along the entire front, and, for those who desire the enjoyment of

refreshing sea breezes, ocean-bathing or the sport of gunning and fishing, with freedom from the conventionalties of the fashionable watering-places, these afford an ideal location.

The surface is level, soil mostly light and sandy. Within the past two decades more interest has been taken in agricultural pursuits than formerly. Corn is the leading cereal crop, being used for feeding the domestic animals and poultry, the latter being a prominent industry and profitable for flesh and egg-production. In the vicinity of Toms river and Island Heights, Manahawkin and New Egypt are excellent farming lands, and dairying, as well as general farming, is followed.

Small fruits and berries, with the usual field and garden vegetables, are extensively grown. Clearings in the natural pine forest, which afford protection, and a warm, dry soil give special advantages for growing early crops. Cranberries are produced to some extent, and huckleberries grow in profusion and are a market crop of much value. The fish and oyster industries afford profitable employment to a large number.

To those desirous of engaging in light agricultural or horticultural pursuits and of securing the advantages of cheap land, a soft, piney air and the usual seacoast sports, Ocean, like other seacoast localities, offers many attractions.

SALEM COUNTY.

This is the southwestern county of the State; its boundaries were fixed in 1710, and included Cumberland, which was taken from it in 1748.

It is well-watered by the Salem river and numerous creeks, the former being navigable for steamboats as far as Salem.

The county is of alluvial formation and generally level. The soil, mostly sand or gravel, is frequently mixed with clay or loam.

Agriculture is the leading occupation, and the farmers are among the most progressive to be found in the State. This is largely owing to the agricultural organizations, where

information is gained and a healthy emulation to intensive farming encouraged.

Dairying is the leading feature, and some of the best and most profitable dairies in the State are to be found here. Feeding balanced rations has increased the flow of milk and at less cost than by the old methods. Most of this product is shipped to Philadelphia, Camden and Atlantic City, while several local creameries are located at convenient points. This county is famous as one of the pioneer localities in the manufacture of ice cream for the Philadelphia market. There are now forty silos and the number is increasing every year.

The cereal crops—wheat, corn, tomatoes and potatoes—grow luxuriantly. Grass, both natural meadow and cultivated, yields abundantly. Sweet potatoes are raised extensively, and, where the lighter soils prevail, are one of the leading crops. Other vegetables and fruits, small and standard, do well.

Tomatoes are a field crop; the plants, grown in hot-beds, are set early, and, being well fertilized, mature their crop early; the first pickings are often forwarded to city markets, while the bulk of the yield is used by the numerous canning factories located in the county. To those who desire a diversified line of agriculture and good social advantages, this portion of the State possesses superior attractions.

SOMERSET COUNTY.

This is the most central county in the State, and was settled early by the Dutch and set off from Middlesex in 1688. The preamble to the act is both unique and interesting, to wit:

"Forasmuch as the uppermost part of the Raritan river is settled by persons whom, in their husbandry and manuring their land, forced upon quite different ways and methods from other farmers and inhabitants of Middlesex, because of the frequent floods that carry away the fences on the meadows; the only arable land they have, and so by consequence of their

interest is divided from the other inhabitants of said county: Be it therefore enacted," &c.

Its bounds have been altered at different times, and the present area is about twenty-five miles long, with an average width of fifteen miles. The surface is diversified—the central and southeastern portion fairly level, the southern and southwestern hilly and the northeastern quite mountainous. The soil of the hills is mostly clay loam, the plains sandy loam and the mountain valleys limestone.

It is also well-watered by the Raritan river and its tributaries, affording excellent water-power for milling and manufacturing purposes, also natural drainage, and the bottom or meadow lands are among the most productive for hay and pasturage in the State.

From the above-quoted preamble it will be seen that the early settlers followed the pursuit of agriculture, and some of its citizens to-day are among the leading farmers in the State. The cereal crops of summer and winter grain grow well, and parts of the county that a few years ago were considered almost worthless have, under judicious and intelligent management, become highly productive.

Dairying is followed to a considerable extent, some of the product being shipped to adjacent cities, but the larger part is sold to the creameries, of which there are several—the price paid being based on the quantity of butter fat in the milk.

The raising of horses has been followed for many years, and proved a paying business for those who gave special attention to growing a class of animals adapted for city customers. Much of the land is well adapted to growing staple fruits. The steep hillsides have produced, under proper care, some of the finest peach orchards in New Jersey. Small fruits, of varieties adapted, do well, and so the different lines of husbandry can be successfully pursued.

Somerville, the county seat, is a growing, popular town, having communication with New York City, Elizabeth, Plainfield and other cities and towns east and west by both railroad

A SUSSEX COUNTY DAIRY.

and trolley. Washington's headquarters at Rocky Hill—the Berrien House—where the "Farewell Address to the Armies of the United States" was written, in 1783, and at Somerville the Wallace House, where the Indian campaign of 1778 was planned, are both within the limits of Somerset county.

SUSSEX COUNTY.

This is the northern county of the State, formed from Morris county in 1753. In 1824 its limits were reduced by the formation of Warren county from its southern portion. It is twenty-seven miles long and twenty-one broad. The central portion is undulating. The Blue mountains run through the western part and the Hamburg mountains are in the northeastern part of the county.

It is well-watered by numerous streams, which, having their source from the mountain springs, make them of a lasting nature. There are also many small ponds or lakes, some being on the summit of the mountains. Along their shores delightful summer resorts are located, and they are liberally patronized. Iron ore and zinc are found in the mountains of the east, slate of superior quality is quarried and a large amount of capital is invested in these industries.

It is also one of the best agricultural districts in the State—corn, wheat, oats and grass grow to perfection. Dairying is a leading feature. The broad and fertile valleys between the mountain ranges, with never-failing streams of water running through almost every farm, luxuriant grass, natural and cultivated, make it an ideal location for this business.

There are fourteen creameries located at convenient points within its bounds. When there is demand, at paying prices, much of the product they receive is sent to New York, and, at other times, is made into butter.

Sussex has, for many years, been noted for the raising of horses, and some of the finest horse farms in the State are to be found here. Sheep-raising, once extensively pursued, both

for wool and mutton, is receiving increasing attention, especially upon farms where cultivation is difficult.

All standard fruits are grown with success. Apples, peaches and pears grow to perfection, both soil and climate being congenial. Many hillsides are now covered with productive peach orchards, and the outlook is so bright that thousands of young trees are being set annually. A drive through this beautiful country, with its charming view of hill and dale, the well-improved farms, with attractive buildings thereon, is convincing that the inhabitants are thrifty and comfortable.

UNION COUNTY.

This county was set off from the southern part of Essex in 1858. It has geographical advantages over many parts of the State. Convenient to New York, thousands find here a quiet, restful location for homes, with freedom from bustle and confusion in the large cities.

Several large and important towns are within its bounds. Elizabeth, formerly called Elizabethtown, was the third settlement made in the State, and the first by the English. It was incorporated "Borough of Elizabeth" February 8th, 1739. Near Elizabeth stands "Liberty Hall," the residence of William Livingston, the Revolutionary War Governor of New Jersey.

Phillip Carteret, the first Governor of New Jersey, came to this town in 1665, made it the capital of the Province, and named it in honor of Lady Elizabeth, the wife of his brother, one of the proprietors of East Jersey. The first General Assembly of the State met here in 1668, and continued, with few exceptions, up to 1682.

The College of New Jersey, now Princeton University, was started in this town, under the direction of Jonathan Dickinson, its first President.

Plainfield, a beautiful and thriving city, with the city of Rahway and many other rapidly-growing towns in other parts of the county, give evidence of its popularity as a place to live.

The surface is level in the southern half, but in the northern it is hilly. The soil varies in composition, some, sand and clay mixed with loam, and other, red shale.

Agriculture is followed on such general lines as in other adjoining counties. The convenience to markets, where milk can be delivered to the consumer by the producer, has led one-half or more of the farmers to engage in milk-production. A number of fine herds of choice-bred cattle, with improved stables and dairy barns, give evidence of progress and profit in dairy husbandry.

Cereals are not largely grown, corn being the leading grain crop, as both grain and fodder are utilized for dairy purposes. Hay, potatoes and tomatoes are leading products for the nearby markets.

Standard fruits, as apples, peaches and pears, thrive well; market gardening and truck farming also occupy a large acreage—a small plot of ground, carefully tilled, often yielding larger returns than the ordinary-sized farm devoted to the old standard crops.

The advantages possessed by the farmers of this county are good markets near at hand, a net-work of steam and trolley lines, excellent educational facilities and good roads, for either hauling produce or pleasure driving. Union county was a pioneer in the good roads movement. The "Union County law," which provided for constructing roads under a county system, using crushed stone for the surface of the road, was enacted prior to the law allowing State aid in road-building.

WARREN COUNTY.

This county, originally the southern part of Sussex, was formed into a distinct county in 1824. It is well-watered by many streams, which empty into the Delaware.

The surface is generally mountainous or hilly, with fertile valleys intervening. The most prominent ranges are the Blue mountains on the northwest and the Musconetcong on the

southwest boundary. Lime is abundant, and its use of great value, when properly applied.

Within the bounds of this county are several important towns, beautiful for location, and excellent taste is displayed by the owners in the matter of general appearance and preservation.

Belvidere, the county seat, is located on the banks of the Delaware and both sides of the Pequest (the latter stream emptying into the former at this point), and has, from its settlement, been noted for the intelligence and thrift of its inhabitants.

Washington, located in the beautiful valley bearing its name, has for many years been noted for the large organ manufactories and the number and quality of the instruments made.

Hackettstown, near the southern border, is in close connection with the prominent resort of Schooleys mountain, and is the seat of Hackettstown Seminary.

Blairstown is located in the northern part, and is the home of the late John I. Blair, whose large-hearted beneficence not only founded but liberally endowed the Blairstown Academy, a school for both sexes.

Warren county has also become noted for the excellent quality of cement rock, found in great abundance, and several large establishments are now sending quantities of it throughout the country.

In agriculture Warren stands among the first. The numerous valleys contain some of the best and most productive land in the State. The drained Pequest valley, known as the Great Meadows, produces enormous crops of onions, celery and other market-garden crops. Washington valley is a rich agricultural section, and, in the growing season, with undulating valleys and hills, presents a view, in many respects, unexcelled elsewhere. The hillsides, also, are almost equally fertile.

Dairying has increased during the last decade. Several creameries at convenient points consume a large part of the milk produced. Raising of horses has long been a favorite

business, and the excellent types of this noble animal here developed show years of study and close attention to this particular industry.

Sheep, for many years, have been among the favorite farm animals. The hilltops, where too stony for cultivation, are well adapted for the production of lambs, wool and mutton. Grass and all cereal crops grow to perfection when properly cared for.

In fruits, apples and peaches lead. The natural adaptability of the soil and climate are such that, where proper care is given by the orchardist, these produce abundantly and of the finest quality. Other fuits, berries and vegetables, while not extensively grown for market crops, yield well and amply repay the intelligent gardener.

This county, like others in the northern section, has special attractions for those who delight in a diversified landscape, dry atmosphere, productive lands and the society of progressive, intelligent citizens.

UNOCCUPIED LANDS IN NEW JERSEY.

BY J. C. SMOCK.

There are in the southern part of the State large tracts of land which are still uncleared, or covered with brushwood, and which are adapted to tillage and capable of producing large crops of small fruits and market-garden vegetables. The wood on them is mainly oak, with some pitch pine and yellow pine, and hence they are called oak lands to distinguish them from the more sandy lands and tracts on which the pitch pine grows almost exclusively. The latter are known as pine lands. The total area of cleared (farm) lands in the southern division of the State, southeast of the marl belt, is about 450,000 acres. The pine-land belts have an aggregate area of 486,000 acres, leaving at least 800,000 acres of these situated as to be accessible by railways traversing them from the large cities and also near to tide-water navigation. The maps of the Geological Survey show the location and the extent of these lands, their railway lines and their relation to the settlements already made and to the cities of the State and of the adjacent States.

The soils of these tracts are sandy and not naturally so rich and fertile as the more heavy clay soils of the limestone, the red shale and the marl districts of the State, but they are not so sandy and so coarse-grained as to be non-productive, as is the case with some of the pine-land areas. The latter are often deficient in plant-food and are deservedly characterized as "Pine Barrens," and too poor for farm purposes. The growth of wood (oak and pine), as well as chemical analyses, shows that the oak-land soils contain the elements of plant production. They are not so well suited to pasturage or to continuous cropping as naturally-rich virgin soils, hence they

are better fitted for raising vegetables, melons, sweet potatoes, small fruits, peaches and pears than wheat, Indian corn, hay and other farm staples. The eminent superiority of this kind of farming in New Jersey over the old routine of wheat, hay, corn and potatoes is so well known that it is useless to do more than refer to the fact. The profitable farming is now in raising those crops which can be produced on these South Jersey soils. The success at Hammonton, Egg Harbor City, Vineland and other places is notable, and equally good results are to be had at a hundred or more places as well situated as they are. These lands are sold at a merely nominal figure, and the settler saves in capital and interest account. They are easily cleared of brushwood or standing timber, and the wood is salable in all this part of the State at remunerative prices, often producing a larger return than the original cost of the land. The soil is easily cultivated, and throughout most of the year it is possible to work. The long working season and the short and mild winter favor the arrangement of work so that all is done with the least outlay for help.

The West Jersey railway, the Pennsylvania and the Philadelphia and Reading's Atlantic City railroad, the Philadelphia and Seashore railway, the New Jersey Southern railroad, and other branch roads tributary to these main lines, afford excellent transportation facilities for access to New York, Philadelphia and the cities of the State. The Cohansey, Maurice and Mullica rivers head well up near the northwest limits of these lands, and their navigable reaches run for miles across them. The waters of the Delaware bay and the ocean are within a few miles of a large part of this oak-land domain.

The advantages of an old-settled and Eastern State, lying between New York and Philadelphia and Baltimore, and within easy reach of these large markets, of a soil which is easily tilled and generous and quick in its response to feeding, and of low-priced lands, are such as to commend them with equal, if not greater, force than do the rich prairie soils of a New West, or the low prices and cheap lands of the abandoned hillsides of New England.

MARL.

Marl deposits extend from Raritan bay and the Atlantic ocean southeasterly across the State to Delaware bay at Salem. Its length is one hundred miles, its breadth running from nineteen miles at the northeast point and nine at the southeast point at Woodstown. The area included in this formation is not far from 1,250 square miles.

These beds or *strata* of marl *dip* towards the southeast. They differ in mineral composition and appear to have lain without disturbance in relation to each other ever since their deposition from the ocean.

When first discovered and for many years thereafter these marls had a wide use. Some of the richer deposits were carted in wagons by farmers, during the winter months chiefly, many miles distant from the place of deposit. They were very valuable in the restoration of exhausted soils. By the use of marl, clover and other grasses were produced as never before, and with the advent of such crops the exhausted humus was restored, the soil was enlivened and quickened, crops of potatoes, wheat, hay, &c., followed, and a new and profitable agriculture took the place of sterility of soil and unprofitable work.

Since commercial or manufactured fertilizers have been made possible by the discoveries of chemistry, these mineral manures are not so extensively used, but their value is as great as formerly, and those who live near these deposits have an unfailing source of fertility near by, which costs but little, and only needs judicious application to make a good profit to the farmer who uses it.

The analysis here given is an average of five analyses of Squankum marls from as many different marl deposits near Farmingdale (Squankum), Monmouth county.

Phosphoric Acid.	Sulphuric Acid.	Silicic Acid and Sand.	Potash.
3.58	0.97	53.15	3.75

Lime.	Magnesia.	Alumina.	Oxide of Iron.	Water.
3.27	1.75	8.79	15.94	8.98

FOREST AREAS, VALUES, &c.

In the foregoing articles but little reference has been made to the extent, location and value of the wooded area of the State. The forests are intimately associated with the healthfulness, beauty and water-supply of a State, in addition to the commercial value of the annual lumber output.

The following brief statements in relation to the forests of New Jersey are extracted from an address before the New Jersey State Board of Agriculture at its annual meeting, January, 1900, by Professor C. C. Vermeule, Topographer Geological Survey New Jersey:

"There has been a steady improvement in the forests of New Jersey, which are unquestionably as extended in area and more luxuriant than they were at the middle of the nineteenth century.

"It is true that to-day our State has not, and is not likely to have in the near future, an important logging or sawed lumber industry, for most of our heavy forests were cut off before 1860. The census figures for 1890, while perhaps incomplete, afford a means of comparison at least. At that date the sawmills reported merchantable lumber cut from only 8,355 acres, whereas in New York the acreage was 120 times and in Pennsylvania 175 times as much. The yield of merchantable lumber per acre was 4,986 feet, board measure, in New Jersey, 5,631 feet in New York, 10,104 feet in Pennsylvania, and from 5,413 to 8,714 feet in the South Atlantic States, so that we were low in the scale. But in the value on the stump, per thousand feet of lumber, we were far in the lead; the figures for New Jersey being $5.60; for New York, $1.90; for Pennsylvania, $2.25, and for the South Atlantic States, from 86 cents to $2.86.

"The demand for fuel, telegraph, telephone and trolley-poles, piling and railroad ties, is sufficient to absorb the entire product of our forests. For such uses chestnut may be most profitably cut at from 35 to 45 years old. Oak at from 40 to 50 years. Excepting the fuel, or cord-wood, in which there is now very little profit, these uses afford as profitable an outlet as merchantable lumber, and the forest can be more frequently cut. Some years ago there was much more cutting of cord-wood, hoop-poles and coaling than at present, consequently the wood was cut off younger, at about 20 to 25 years, instead of 35 to 50 years.

"Such are the economic conditions which determine the present forest age and tendencies. Let me explain that I use the word forest to include all land devoted to timber-raising, consequently stump-land, brush-land and all stages of growth, up to merchantable timber, are classed as forest.

"The total area of forest in New Jersey measures 2,069,819 acres. The cleared farm land is almost exactly equal in area, viz., 1,999,117 acres; in round numbers 2,000,000 acres of each. Of this, 800,000 acres is practically all deciduous timber, mainly chestnut, the several varieties of oak, maple, with many other kinds interspersed; 1,200,000 acres is coniferous forest, mainly pitch pine on the upland and white cedar in the swamps. This coniferous forest is the well-known pine belt of Southern New Jersey.

"There are two great forest regions. The largest is the coniferous forest, 1,200,000 acres in extent, in Southern New Jersey. Next comes the forest of the Northeastern Highlands, 211,000 acres, covering the northern portions of Morris and Passaic counties, the southeastern border of Sussex and a small part of Bergen. Next in size is the forest region of Kittatinny mountain, in Sussex and Warren counties, comprising 58,000 acres.

"A smaller area, but a notable one, is the Palisades mountain forest, in Bergen county. We have here 11,000 acres of fine forest, with many trees 20 to 30 inches in diameter and 60 to 80 feet in height, surrounded by the dense urban and sub-

urban population of that section near New York City. This forest seems quite as worthy of preservation as the Palisades themselves. Indeed it is a remarkable fact that Bergen county, as a whole, has 40 acres of forest to 60 acres of cleared land, and much really valuable timber, although so near the large cities.

"The trap ridges, First, Second and Sourland mountains, are quite well wooded, and so is the southern part of Middlesex county, especially the watershed of South river.

"The most completely deforested sections are the Raritan valley, including Piscataway township, in Middlesex, and nearly all of Somerset and Hunterdon counties, Mercer county, and the belt of fertile land extending back about 12 miles from the Delaware river from Trenton down to Bridgeton. Similarly bare of forest are the valleys of Warren county and a small area about the Shrewsbury river, in Monmouth county. All of these districts have less than 10 acres of forest to 100 acres of upland. The beautiful Kittatinny valley, in Sussex and northern Warren, has 19 acres of forest to 100 acres of upland.

"When we consider the excellence of the timber, however, we find that, as a general rule, those portions of the State having the smallest acreage of forest have the most valuable timber. This is partly because this timber is owned and cared for in connection with farms, and partly because the soil is better. The farmers of New Jersey have quite generally appreciated the value of ten acres or so of timber connected with their farms, and, notably on the red sandstone, this timber on the farms has not only supplied the farmer with fuel, fencing and an occasional stick of timber, but has gone on increasing in size until the offer of the lumberman becomes a tempting one, and the steam saw-mill does its work. There is still much heavy timber scattered over the red sandstone and clay and marl regions. The occurrence of trees from 24 to 36 inches in diameter here is much more common than diameters of 12 to 24 inches in the Highlands.

"The land now occupied by forest probably returns an aggregate product worth $4,000,000 annually, and affords employment to many persons. Some of the agricultural sections are too bare of forest. Every farm has waste-land, which should be in forest. The ravines and hillsides of the red shale country are of no use for cultivation, and many side hills here and in the State wash badly if ploughed. All these should be kept in woods, thus affording wind-breaks, shade for cattle, and the necessary fuel, fencing, &c., for the farmer. If forest can be profitably managed by any one, it can be by the farmer in connection with his farm. The necessary pruning can be done when he cuts his fuel, and the product can be gathered at seasons when there is little other work. If the forest is already there, care for it; if not, plant a few trees—a few chestnuts, oaks, hickories, maples and walnuts; keep the cattle out of the young growth, thin it when necessary, and nature will do the rest. The waste places will become beautiful, your farm more valuable, and you will soon derive an annual profit from it.

"Of the 2,000,000 acres of forest in the State, 40,000 acres may be cut each year—16,000 acres of oak and chestnut and 24,000 acres of pine and cedar—without causing any diminution in the present visible timber-supply, for it will, at this rate, take fifty years to cut it all, and we may then begin again. At present there is not so much as this cut.

"Our forests are well worthy of serious attention, because of their beneficial effect upon the water-supply, their importance in preserving the favorable climatic conditions, their attractiveness, and the value of their product, and the forest-owner should have the benefit of the same kind of assistance and suggestion that has been extended by the State to the farmer, the miner and other industries."

WASTE LAND.

While presenting, in a very brief outline, the agricultural characteristics and possibilities of the several counties of the State in the preceding descriptions, we do not claim that every foot of New Jersey's soil will respond to spade and plow with enormous crops. It has its proportion of waste-land, or land not naturally adapted to agriculture, and, in this respect, does not differ from other States. But we do claim that all its productive land will reward intelligent culture and judicious management with paying crops, at near markets.

By waste-land is meant marshes and marsh-meadows, sour and wet lands, steep and rocky hill or mountain sides, and sandy plains not possessing a fruitful soil. (But even a large portion of such lands return some product of wood, stone, pasture or coarse hay.) All such and similar lands may be considered as coming under the term "not naturally adapted to agriculture;" and, although such land might be brought into productiveness, it is not likely that it will be until the increased profits from agricultural products will warrant such an outlay of money for labor and fertilizers.

Through ignorance of the natural capability of such land to produce profitable crops, attempts have, from time to time, been made to cultivate and improve them, not only in New Jersey, but also in other of the Eastern States; and where such attempts have resulted in failure and desertion, such farms have been erroneously classed as "abandoned farms;" but the fact is they are not qualified by nature to produce paying crops. Strictly speaking, there are no "abandoned farms" in New Jersey.

Old Bridge and New Brunswick Road. (Before Improvement.)

Old Bridge and New Brunswick Road. (After Improvement.)

TRANSPORTATION FACILITIES.

The transportation facilities of New Jersey, as a State, are unsurpassed. There is no place more than seven miles distant from some railroad, and new roads, both steam and electric, are built from year to year. The numerous inland waterways, consisting of navigable streams and canals, afford additional means of cheap transportation.

The total mileage of railroads, not including fractions of miles, in the State January 1st, 1900, is 2,278 miles; of canals, 173 miles. The assessed valuation of the railroad and canal property in 1900 is $221,410,459. These properties were taxed for State and local purposes in 1900 $1,520,826.07.

The taxes from these and other corporate interests, added to other State incomes, makes it possible for New Jersey to get along without a State tax, except for school puposes, and even this is being rapidly reduced and bids fair to become a State instead of an individual matter, liberal appropriations having been made by the last and previous Legislatures from the State funds for school expenses.

In this connection it is proper to refer to the superior system of wagon-road improvement, inaugurated some years ago, and which has grown so rapidly. The road question has been a prominent one for many years, and some of the most valuable enactments have been initiated and secured by the State Board of Agriculture. This is especially the case with the Stone Road law.

This law was passed in 1891, and allows the State, under certain prescribed conditions, to aid the counties and the property-holders, along the line of road to be improved, in defraying the cost of construction, and is therefore known as the "State Aid" law. This system of road-building originated

in New Jersey, and has become noted over this entire continent.

Under this law there has been built over six hundred miles of hard roads. The counties and other municipalities have constructed as many more miles, so this State can present to the traveling public over twelve hundred miles of hard roads, passable with heavily-loaded teams at all times of the year, in all kinds of weather.

It has given continuous lines east and west, north and south throughout the State, connecting all the large towns and fine farming sections with the large cities of this and adjoining States, thus giving unrivaled opportunities for marketing farm and garden products by the producer, with his own team, to the doors of the consumer, thus insuring the best possible price and saving vast sums in freights and commissions, and for the passage of pleasure vehicles over the cultivated plains and through the fine mountain scenery of the State.

The numerous hard roads that can be seen in any portion of the State, and the enjoyment most citizens have from their use, is inducing all of our communities to take measures to have many more miles paved with stone and gravel. The demand is so great the inhabitants are constantly insisting upon building ahead of the State appropriation, in order that they may immediately enjoy them. We are now spending about five hundred thousand dollars a year for improved roads annually.

New Jersey has made a most gratifying growth, as revealed by the new census. Its rate of increase of thirty per cent. is matched by no State east of Texas and Minnesota. Its gain in the last decade of 438,736 people has made it, although one of the smallest States in the Union, the sixteenth State in point of population—Rhode Island and Massachusetts being the only States having more people to the square mile than New Jersey—and this growth is largely due to its admirable road system. Besides those already built, over five hundred miles more are petitioned for, the estimated cost of which is about two million dollars.

These roads have made it possible to extend the free rural mail system and numerous routes have been established. A moment's reflection will convince intelligent people that this fourfold improvement—railroads, trolley roads, stone roads and free delivery of mail matter—relieves rural life of its former monotony and isolation, and, added to this, the neighborhood telephone is being introduced.

THE STATE AGRICULTURAL COLLEGE.

By an act of the State Legislature, in 1864, the income from the land-script fund for the maintenance "of a college to teach such branches of learning as are related to agriculture and the mechanic arts" was directed to be paid to the Trustees of Rutgers College, for the salaries of teachers in that branch of the college designated in the act as the State Agricultural College. The annual income to the college from this source is $5,800, and, in order to meet the further requirements of the law, which provided for forty free scholarships to students from the various counties of the State, the institution was enlarged, additional professors appointed, and a farm of 100 acres bought and maintained.

In 1888 the Trustees of the college offered ten extra scholarships, and in 1890 a further act of the Legislature provided for an additional scholarship to each Assembly district. These scholarships are now all filled, and there have been but few vacancies since the provisions of the acts were accepted by the college. More than 800 students have been in attendance at the institution, of which over 250 have graduated, the remainder having attended for shorter or longer periods, as circumstances permitted, nearly all of whom are now engaged in farming or other industrial pursuits and taking prominent places in business affairs.

In 1890 an act providing for the more complete endowment and support of the Colleges for the Benefit of Agriculture and the Mechanic Arts was passed by Congress. By the provisions of this act the sum of $15,000 was appropriated for the year ending June 30th, 1890, and an increase of the amount

Rutgers College, Campus in foreground.

by $1,000 until the annual appropriation shall be $25,000. This addition to the funds of the Agricultural College was very grateful, since the early appropriation of less than $7,000 had not been supplemented by any appropriations by the State Government, as has been the policy in most of the States of the Union.

In 1891 the regular course in agriculture was thoroughly revised, and the various departments more completely equipped. In 1892 College Extension in Agriculture was begun. This feature of the college work seems to meet a well-defined want, and promises to be of great usefulness. Several courses of lectures have been given by the Professors of Agriculture, Botany and Entomology, and the attendance and interest in the work are growing rapidly.

The aim of the State College is to meet the present pressing demands on the part of the farmers for a broader education and a more detailed knowledge of the principles which govern their business, while, at the same time, maintaining its high standard as a scientific institution; and, in order that this purpose shall be fulfilled, there must be hearty co-operation, not only on the part of the farmer and his organizations, but on the part of the State, in providing liberal endowments and in exercising a fostering care.

AGRICULTURAL EXPERIMENT STATIONS.

The New Jersey Experiment Stations are located in the north-central portion of the State, between the hilly region, which constitutes the northern third of the State, and the southern plain, between the Delaware river and the Atlantic oceans; one is maintained entirely by the State, the other by the National appropriation. The State institution, the New Jersey State Agricultural Experiment Station, was organized in connection with the State Agricultural College in April, 1880, in accordance with an act of the State Legislature. The New Jersey Agricultural College Experiment Station was organized early in 1888 as a department of the Agricultural College, in accordance with the act of Congress. On organization of the College Station, the lines of experiment were divided, the chemical work being assigned to the State Station, and entomology, botany and horticulture, biology and chemical geology to the College Station, the policy being that the work of each Station should supplement that of the other.

ORGANIZATION.

The State Station is controlled by a Board of Managers, consisting of the Governor of the State and the Board of Visitors of the State Agricultural College, appointed by him for a term of two years, and composed of two members from each Congressional district, together with the President and Professor of Agriculture of the college. This board holds a meeting at least once a year to act upon the report of the Director and upon such recommendations as he may make. The policy has been to relegate the direction and manage-

Laboratory of the New Jersey State Agricultural Experiment Station.

ment of the work of the Station to the Director. The officers consist of a President, Vice President, Secretary and Treasurer. Members of the board are reimbursed for actual expenses.

The College Station is under the control of the Board of Trustees of the Agricultural College. The management of the Station is delegated to an Executive Committee of the board, consisting of seven members.

EQUIPMENT.

The Station buildings comprise a laboratory building, greenhouses and dairy-house. The laboratory is a three-story building, 50 by 100 feet, with basement and attic. The basement is of rough stone, the superstructure of brick. It was planned especially for the Stations, is well equipped for the lines of work carried on, and provides ample accommodations for offices and laboratories of the Chemist, Botanist, Entomologist, Biologist, Geologist and other specialists who may be engaged in experimental work. The Stations also make use of the college buildings.

Five acres of land are used in field experiments with fruits and vegetables, and two acres in experiments with plant diseases. These areas were transferred by the college authorities to the authorities of the Stations in 1895, no compensation being paid by the Stations. In addition the college authorities transferred to the Stations the remainder of the farm (about 85 acres) in April, 1896. This land is used for experiments in dairy farming. The business of the farm is kept as a separate account, and the income is sufficient to pay running expenses and contribute to the cost of experiments.

The Stations own but little live stock. They make use, however, of the college herd of about 35 cows in their experimental work in dairy farming. Permanent herds are maintained, though individual animals are purchased from time to time for use in special experiments.

The collection of specimens in the botanical division consists of a nearly complete set of the vascular plants of the State, represented by 7,000 specimens; a catalogued mycological herbarium of about 40,000 specimens, and a set of the weeds of the world, with the seeds of several hundred kinds arranged in cases. The collection in the division of entomology is in two parts—a systematic series and an economic series. In the systematic series are over 4,000 species, represented by at least 25,000 specimens. The economic series is very complete, and represents all of the usual injurious insects occurring in the State, in all stages, with specimens of the injury caused by them. Each subject studied is illustrated as far as possible or necessary by microscopic slides, and of these between 2,500 and 2,600 have been accumulated. The division has also nearly 900 lantern slides, illustrating a great range of subjects in economic entomology. Station workers have access to the college museum, which is very well supplied with mineralogical specimens. The library contains 2,855 works on agriculture and related sciences, besides all of the leading American and foreign scientific journals, and the college library contains 60,000 volumes.

The Stations are well equipped with apparatus, a number of pieces of which have been devised by Station officers.

FINANCIAL SUPPORT.

The income of the State Station is derived from an appropriation by the State for maintenance. The income of the College Station is derived from the National fund. The income of the Stations during the present fiscal year is as follows:

State Station, regular appropriation	$15,000 00
for inspection of feeds	3,000 00
for printing bulletins	1,000 00
College Station, United States appropriation	15,000 00
Total	$34,000 00

Dairy Barns. State Agricultural College Farm.

The State Station is charged with the inspection of commercial fertilizers and commercial feeds. The Station also devotes considerable time and attention to the analysis of standard fertilizing materials, waste products and special fertilizer mixtures. The primary purpose of this work is to inform the farmers of their composition and the relative cost of the constituents in them and in regular brands of commercial fertilizers. The New Jersey Stations were the first American Stations to advocate the home-mixing of fertilizers. Inspection of nursery stock has recently been added to the duties of the Entomologist.

The scientific investigations of the Stations have been mainly in the interests of dairy husbandry and horticulture, which are the principal branches of agriculture in the State. A division of horticulture was not organized as such until 1895, although investigations in the interest of this industry along the lines of plant diseases and entomology have received a great deal of attention since the organization of the College Station.* Immediately upon the organization of the horticultural division, it set about making a statistical survey of the fruit interests of the State preliminary to determining upon lines of experimental work.

The work in dairy husbandry is along lines of economics of the dairy. It has to do with the crops best suited for dairy farming, the cost of production, their relative value, rotations and methods of preservation. Considerable attention has been paid to the more strictly business side of dairying, such as the influence of quality, as represented by cleanliness, &c., upon the salability of milk and cream. A large number of feeds, fodders and farm crops have been analyzed, among which were a number of the newer forage crops grown especially for soiling purposes.

* The first compilation on entomological subjects, in connection with State work, was prepared by the Secretary of the State Board of Agriculture Mr. Franklin Dye, in 1886 and was published in the Annual Report of said Board, in 1887. It was entitled "Entomology: comprising Cuts and over two hundred Delineations of Various Insects, with some General Truths in Applied Entomology." Prof. Geo. D. Hulst was chosen Entomologist of the Station in 1887.

The Station has always taken a prominent part in the development and improvement of chemical methods, having for their object the shortening of chemical processes without lessening the accuracy of the results. Among such have been studies on methods for determining total nitrogen from nitrates and on the availability of organic nitrogen. In cooperation with the United States Department of Agriculture, the Station investigated the changes which occur in the composition of maize, oats, wheat and buckwheat in breakfast foods in the various methods of preparation. Studies were made on the bread-supply of a few of the larger cities of the State, the object of which was to secure information concerning the chemical composition of bread, to ascertain the relation of the weight of bread to the selling price of the loaf, and to study the changes which occur in the baking of bread and the relative cost of nutrients in bread and in flour.

The Entomologist has made important original investigations on the peach borer, strawberry roller, asparagus bettle, rose bug, sinuate pear borer, certain katydids, the horn fly, potato-stalk borer, pear midge and tulip soft scale. Monographic accounts have been published of the insects attacking the cranberry, blackberry, cultivated Cucurbitaceae, sweet potato, city shade trees, and a general history of plant lice, with methods of treatment, has been prepared. The life history of the squash bug, apple plant louse and a number of the more usual garden pests have been worked out, and means of repression suggested. Experiments have been carried on to ascertain, if possible, the reasons for the resistance of wireworms to insecticides.

In the botanical division the most attention has been paid to investigations of diseases of the sweet potato and of greenhouse plants. It has been shown that probably the blight of the eggplant is identical in nature with one of the diseases of the sweet potato. Experiments in the treatment of the sweet potato decay have shown that sulphur or kainit may be effectively used. Among the diseases of greenhouse plants that have been studied may be mentioned a fungus

disease of the violet and root galls. Field experiments have been made with various substances, with a view to finding a remedy for the cranberry scald. A serious disease of the bean was shown to be due to bacteria. A common disorder of cultivated roses was found to be due chiefly to root galls and anthracnose.

The diseases of the sugar beet have been studied, and it has been shown that Bordeaux mixture will, in a large measure, prevent the leaf spot. Experiments in pruning and the application of manures and fertilizers for eradication of pear blight are in progress. Field and laboratory experiments have been made with the asparagus rust, and Bordeaux mixture has been shown to be an effective remedy.

Experiments have been made with different fungicides on a large number of fruits, vegetables and ornamental plants. Bordeaux mixture was taken as a standard, with which three other compounds were compared, the lime being replaced by sulphur, potash and ammonia, respectively. Experiments made to test the susceptibility of various plants to disease showed that they differ greatly in this respect.

A study has been made of the weeds of the State, particularly with reference to their means of dissemination, including propagation by underground parts, and a check list of the weeds of North America has been prepared. The relative aggressiveness of different weeds is being tested experimentally on a small plat. Experiments have been made with a fungus enemy of the thistle. The subject of poisonous plants has received some attention.

The Biologist has made original investigations on tuberculosis. The question of what constitutes a tuberculous reaction has been studied, and a revision of previous practice made in the direction of greater accuracy. Observations on the normal temperature variations in cows led to a more accurate determination of the extent to which the injection of tuberculin affects individual animals. In experiments to determine whether healthy cattle are injuriously affected by being subjected to the tuberculin test, no such effect was observed. It was also

shown by experiments that with cattle in the first stages of tuberculosis, repeated injections of tuberculin tend to cure the disease. The prevalence of milk fever and infectious abortion in the State have been investigated. Studies have been made on the germ content of milk, as found in the udder, and at various stages from the time it is drawn from the cow until it is bottled.

DISSEMINATION OF INFORMATION.

The bulletins of both Stations are issued in the same series. In the regular series 149 have been issued, and in a special series 19, lettered from A to S, inclusive. The State Station has issued 20 annual reports, and the College Station 12, which, however, have been bound in the same volume since the establishment of the latter Station. The reports contain a full account of all work to be reported on for the year.

The mailing list contains about 10,000 names, all of which were placed there by the personal request of persons receiving the bulletins. The Director, Dr. Edward B. Voorhees, is the author of a work on "The First Principles of Agriculture," and another on "Fertilizers." The Entomologist, Dr. John B. Smith, is the author of a work on "Economic Entomology." The correspondence amounts to about 7,000 letters a year. Members of the staff take part quite commonly in farmers' meetings throughout the State.

The general results of work are thus summarized in a Report on the Work of the Experiment Stations of the Country, by Dr. A. C. True, of the United States Department of Agriculture:

"The agriculture of New Jersey is intensive, and hence fertilizer problems are of primary importance. For many years the investigations of the State Station along this line have been well known, and its management of the fertilizer control has been very successful. The work in horticulture and dairy husbandry is noteworthy for the systematic way in which it is conducted and for the practical value of the re-

Residence of Dr. E. B. Voorhees, College Farm, New Brunswick, N. J.

sults obtained. To a high degree the Station has been successful in meeting the requirements of the farmer in the field and in obtaining his approval and cordial support for the Station. The investigations in biology—those of the Botanist, Entomologist and Biologist—likewise have their starting-point in practice, and follow the same systematic methods, but with the addition of the strict analytical methods of science. The results obtained are in many cases of scientific importance, while their practical value and the popular approval with which they have been received show that the original purpose of the investigations have not been lost sight of.

"The Stations continue to keep in touch with the farmers of the State by the frequent attendance of their officers at farmers' institutes. The success of the New Jersey Stations in gaining the confidence of the farmer, and in modifying his practice by getting him to make application of the results of their work, is very noteworthy."

AGRICULTURAL ORGANIZATIONS.

The oldest State farmers' organizations are the State Board of Agriculture and the State Grange, both organized in 1873, and the State Horticultural Society, organized two years later. These societies are contemporaneous and are mutually helpful. The purpose and work of the Grange are well known, and its comprehensive efficiency as a farmers' organization is acknowledged. Local farmers' clubs existed, however, in different parts of the State as early as 1840.

The State Board of Agriculture is organized as a representative body. The members of all agricultural and horticultural societies, farmers' clubs, granges of the Patrons of Husbandry and other agricultural associations constitute the membership.

The Board of Directors consists of—

Class A—Two members of the Board of Managers of the Geological Survey, to be appointed by said board; two members of the Board of Visitors of the State Agricultural College, to be appointed by said board.

Class B—The Professor of Agriculture in the State Agricultural College, the President and Director of the State Experiment Station, and the Master and Secretary of the State Grange, Patrons of Husbandry.

Class C—Two delegates from the State Horticultural Society, two delegates from the Cranberry Growers' Association, two delegates from the State Poultry Association, one delegate from each Pomona Grange, and two delegates from each County Board of Agriculture auxiliary to it.

The board at the annual meeting elects its President, Vice President, Secretary, Treasurer and Executive Committee; the Secretary being elected for a five-year term.

The total amount appropriated to the board by the State is $6,000. Out of this comes the salary of the Secretary, Treasurer and clerk hire, appropriations to State Horticultural Society and County Boards of Agriculture, and the expenses of the annual meeting, of the Executive Committee and of other committees appointed, while engaged in the duties of the board, and also expressage and postage.

From a small beginning the board has grown to be a strong, representative body, and exerts a very helpful influence in the advancement of agriculture throughout the State. It finds its duties in investigating and recording whatever concerns the agricultural interests of New Jersey. Its investigations include facts relating to the various soils of the State, their chemical and mechanical condition, their productiveness and susceptibility of improvement; the best natural and artificial fertilizers, their adaptability to crops; the best methods of rearing, improving and fattening stock, including the prevention and eradication of all forms of disease among them; the examination of new implements, and processes of working the soil and the best method of drainage; the economy of farm management as applied to market gardening, farming and forestry; the proper laying out of a farm into pasture, meadow, tilled land and woods; the location, construction and economy of farm buildings and fences; the methods and principles of beautifying rural homes, and the consideration of what legislation may be needed to secure the interests of farmers.

It seeks to maintain communication with all societies, associations and clubs organized for the above purpose in the State, to gather from them the results of their observations and experiments, and to furnish them in return results obtained from other societies or digested material drawn from a comparison of the whole of the results together.

It makes its investigations and results useful to the whole State by printing and distributing, as widely as possible, its reports and papers and the results of experiments conducted under its advice in various parts of the State.

The lecture work of the board, since 1890, has been extended and systemized by the organization of what are termed Farmers' Institutes. These are conducted during the fall and winter of each year. In addition to these, the County Boards of Agriculture, which are auxiliary to the State board and are peculiar to the New Jersey system, hold meetings quarterly or oftener throughout the year. All the counties, except two, are organized, and local societies of agriculture, horticulture, &c., affiliate with the county boards.

The State Agricultural College and the Board of Agriculture work in harmony in providing lectures and speakers for the institutes and the county boards. By this arrangement the farmers of the State have opportunity to utilize the latest information on agricultural subjects. The growing popularity of the lecture work is a strong endorsement of its value.

In all these associations, whether boards or Granges, the subjects of farm improvement and agricultural progress are discussed, progressive ideas evolved and reduced to practice. Thus, the road question has had its greatest uplift by the farmers, and whatever progress, on safe lines, has been made is largely due to the interest they have shown.

Free rural mail delivery has been urged, and a number of routes have been established lately, especially where stone and other good roads exist.

A more equitable method of taxation has been secured, and other matters of like importance considered.

The board's official location is in the office of the Secretary, at the State House, Trenton. As an organization, it has nothing to do with the management of fairs in the State. These are under separate control.

STATE WEATHER SERVICE.

BY EDWARD W. MC GANN, DIRECTOR.

The State Weather Service, as established and now in operation under the laws of New Jersey by an act, entitled "An act to establish a weather service in New Jersey," approved June 19th, 1890, and amended April 7th, 1892, appropriating $1,000 annually, is an organization of voluntary observers, co-operating with the United States Weather Bureau and the State Experiment Station, the National Bureau detailing an experienced meteorologist, who is the Director and supervises the work carried on in a commodious office furnished by the State Experiment Station. Here all the records are kept and the various data received from the outlying stations, carefully verified and summarized and issued in the form of a weekly weather-crop bulletin and monthly and annual meteorological reports. Copies of these reports are mailed to all co-operating observers, the various State weather services in other States, to the public libraries and to members of the agricultural societies and Granges of the State.

Each meteorological station is fully equipped with standard self-registering instruments, consisting of a maximum thermometer, minimum thermometer, rain and snow gauge, measuring rod and instrument shelter and the necessary forms, stationery, &c., for use in recording the readings of these instruments. The stations now reporting to the central office are as follows: Meteorological stations, 57; display and disseminating stations, 66, and crop correspondents, 133. The service is controlled by a Board of Managers, consisting of the following: Dr. Edward B. Voorhees, President; Louis

A. Voorhees, Treasurer; Professor B. D. Halsted, and Mr. Edward W. McGann, Director.

The State is divided into four climatic divisions, viz., the Highlands and Kittatinny valley (8 stations), the Red Sandstone plain (19 stations), the southern interior (23 stations), and the seacoast (8 stations).

THE FOLLOWING TABLES SHOW THE NORMAL TEMPERATURE AND PRECIPITATION (INCLUDING MELTED SNOW) FOR THE SEVERAL CLIMATIC DIVISIONS OF THE STATE FOR EACH MONTH OF THE YEAR AND FOR THE SEASONS.

DEGREES FAHRENHEIT.

CLIMATIC DIVISIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Highlands and Kittatinny Valley	26.7	27.2	35.6	48.4	59.6	67.9	72.0	70.6	64.2	61.2	41.1	31.3
Red Sand Stone Plain	29.1	30.2	37.7	49.0	60.5	69.7	73.8	72.4	65.8	53.6	43.0	33.4
Southern Interior	31.0	32.8	39.6	50.6	62.2	70.9	75.2	73.5	66.6	54.5	44.1	35.0
Sea Coast	33.5	34.3	39.4	49.1	59.4	69.1	73.1	72.8	67.8	55.9	45.6	37.0

	Year.	SEASONS.				MARCH OF THE SEASONS.			
		Spring.	Summer.	Autumn.	Winter.	Winter to Spring.	Spring to Summer.	Summer to Autumn.	Autumn to Winter.
Highlands and Kittatinny Valley	49.6	47.9	70.1	62.2	28.4	19.5	22.2	—17.9	—23.8
Red Sand Stone Plain	51.6	49.1	72.0	54.1	30.9	18.2	22.9	—17.9	—23.2
Southern Interior	53.0	50.8	73.2	55.1	34.3	16.6	22.4	—18.1	—20.8
Sea Coast	63.0	49.3	71.7	56.3	34.9	14.4	22.4	—15.4	—18.7

PRECIPITATION (INCLUDING MELTED SNOW), IN INCHES.

CLIMATIC DIVISIONS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Highlands and Kittatinny Valley	3.48	4.22	3.50	3.45	4.73	3.34	5.15	4.51	3.72	3.61	4.20	3.27
Red Sand Stone Plain	3.97	4.07	3.94	3.27	4.18	3.67	5.14	4.46	3.92	3.51	3.95	3.54
Southern Interior	3.50	4.08	4.02	3.61	4.69	3.57	4.72	3.84	3.61	3.73	4.00	3.25
Sea Coast	3.77	3.85	4.19	3.63	4.07	3.36	4.75	4.03	3.55	3.91	3.53	3.27

SEASONS.

	Year.	Spring.	Summer.	Autumn.	Winter.
Highlands and Kittatinny Valley	47.18	11.68	13.00	11.53	10.97
Red Sand Stone Plain	47.69	11.39	13.27	11.38	11.58
Southern Interior	46.58	12.32	12.13	11.34	10.83
Sea Coast	45.92	11.89	12.14	10.99	10.89

THE OYSTER AND FISH INDUSTRY OF NEW JERSEY.

The following table, taken from the Report of the Bureau of Statistics of New Jersey for 1896, shows the acreage devoted to the oyster industry in the localities named, so far as they had been taken up and improved up to that date:

Cheesequake	4
Raritan	123
Keyport	2,760
Shrewsbury	232
Barnegat	296
Tuckerton	528
Great Bay	108
Egg Harbor	47
Eagle Bay	184
Absecon	360
Lakes Bay	166
Ludlams	64
Great Sounds	61
Leamings & Townsends	116
Delaware Bay	7,239
	12,288

There are thousands of acres adapted, by natural conditions, to the propagation of oysters that are not yet utilized.

With proper encouragement and protection, an immense business could be built up, which would yield an annual revenue of many millions of dollars. So diverse and extended is this industry and including, as it does, others, such as boat and shipbuilding, sailmaking, blacksmithing, &c., and those engaged in taking the oysters to the consumers, also hands employed, such as clerks, watchmen, counters, helpers, with an average wage of $40 per month, that it is scarcely pos-

sible to compute the total sum invested in it, or the exact amount in profits netted.

As indicating what it is for other localities, and thus for the entire State at the present time, the following statement, for the localities named, furnished through the courtesy of Hon. Thomas F. Austin, Superintendent State Oyster Commission, is suggestive:

"The oyster industry of Delaware river, Delaware bay and Maurice River cove, in this State, is an extensive one and capable of indefinite expansion.

"Nature has, in the conformation of the bay, divided it into two distinct sections—the natural beds, *i. e.,* where the oyster propagates naturally, and the planting bottom, where the young oysters are placed after being taken from the natural beds and left to grow to marketable size.

"The bottom suitable for the propagation of oysters contains about 90,000 acres, of which not more than 10,000 are at this time productive. The planting bottom, or what is known as Maurice River cove, contains about 50,000 acres, of which 13,000 acres are in actual cultivation; that is, these 13,000 acres have been leased by the State to sundry lessees. The State has issued about 650 leases, each lease averaging four grounds, with an average of five acres per ground.

"The lessees of these grounds pay to the State the nominal rental of 25 cents per acre per year. Under State control, we are warranted in saying that, within the period of five years hence, not less than 25,000 acres will be taken up by citizens of this State.

"For year ending October 31st, 1900, the Superintendent of the Commission issued licenses to 540 boats engaged in the industry.

"A careful canvass of the oyster-shippers of Maurice river, Bivalve and Greenwich piers, has shown that the value of the oysters shipped from this locality—Cumberland county—for the past year was two millions two hundred and sixty thousand dollars ($2,260,000)."

But the work and profits from the seacoast, bays and rivers of the State is not confined to the oyster business. There is yearly employment and profit in the clam and fish trade; the shad and sturgeon caught annually in the Delaware river, as sold in contiguous markets, amount to many thousand dollars.

Salem county alone claims a return of $200,000 a year as her proportion of this business. In 1897 Salem, Cumberland and Gloucester county fishermen secured 8,264,930 pounds of shad, yielding $191,334. In the same year there was shipped from Salem and Cumberland counties 186,475 pounds of caviare, yielding $62,158. And the two counties named are credited with a catch of 668,231 pounds of sturgeon the same year, with a return of $18,719.

Persons living within reach of the coast line of New Jersey may have the luxuries of the sea the year round, and none know their high excellence so well as they who can have them fresh from the catch.

THE JEWISH COLONIES IN SOUTH JERSEY.

BY BORIS D. BOGEN, PH.D., PRINCIPAL.

ALLIANCE.

The first Jewish colony in South Jersey was located in Pittsgrove township, Salem county, in 1882. When the persecuted Jews were driven from Russia a number of wealthy and influential Hebrews in the city of New York formed the Hebrew Aid Society. This society purchased about 1,100 acres of land in Pittsgrove township, in the county of Salem, a little over six miles northwest of the borough of Vineland, Cumberland county.

The settlers numbered about 250 men, women and children. Later on the society proceeded to allot the land in tracts of fifteen acres to each family, on which, before the winter set in, humble cabins were built and occupied by the families, charging each $150, and giving the term of payment at thirty-three years, without interest.

After two or three years the Hebrew Emigrant Aid Society gave place to the Alliance Land Trust, which gave its name to the settlement. The New York Hebrews sent a committee to ascertain if anything further was necessary to be done, and the sum of $7,000 was distributed to the seventy families to enable them to buy agricultural tools and implements.

The soil at Alliance is a light, sandy loam, not well adapted to cereals, of which but little is raised, except a small quantity of corn for home use. It is excellent for growing fruits, berries, grapes and sweet potatoes, and to these, from the beginning, the people have turned their attention, with marked success.

The farmers of Alliance have good stock, the cows especially being of the best; the poultry also will compare favorably with any in this section of the State.

Manufacturing in Alliance has not advanced as rapidly as in the later colony at Woodbine; there is one large factory, which is operated by the Alliance Cloak and Suit Company. One hundred and fifty hands are employed altogether in the factory, where children's coats and cloaks are manufactured. The operatives average about $12 per week, and the wages are paid weekly and in cash. A large three-story factory has been erected a short distance from the old one. The colony of Alliance has recently passed from the control of the Alliance Land Trust to the Trustees of the Baron de Hirsch Fund, which spent $10,000 in public improvement and built twenty fine dwellings.

ROSENHAYN.

In 1882 the Hebrew Emigrant Aid Society, of New York City, located six Jewish families at Rosenhayn, and this has grown to be a village of some note, with a population of 800. It is located on the New Jersey Central railroad, midway between the cities of Bridgeton and Vineland. The population is composed almost exclusively of Russian and Polish Jews, and is about equally divided between industrial and agricultural pursuits.

The articles manufactured are clothing, hosiery, foundry work, tinware and brick. The number of hands employed is as follows: Clothing, 150; brickyard, 17.

The average wages of the operative is about $10. About fifty per cent. own the houses they occupy. The farming portion of the community appears to be fairly prosperous. Of the 1,900 acres comprising the tract, about one-fourth is under cultivation. The soil, as in other colonies, is not well adapted to the raising of cereals, and the attention of the farmers is given to fruit and vegetables. The great source of profit is the sweet potato crop. A canning factory is soon to be

erected, and consequently it will not be necessary to ship the berries and tomatoes. The annual value of the crops raised is $10,000 to $12,000.

WOODBINE.

This settlement was mapped out in 1891. Woodbine is located in Dennis township, in the northwestern section of Cape May county; it is fifty-six miles from Philadelphia and twenty-five from Cape May City and Atlantic City. Two railroads—the West Jersey and Seashore and the South Jersey—give direct communication with the neighboring towns and with Philadelphia and New York. The tract comprises 5,300 acres, 2,000 being now improved.

The town site was laid out in 1899, comprising 800 acres, 275 of which have been cleared. There are about 260 Jewish and about 40 Gentile families. Seventy-five per cent. of them own their homes. The public buildings comprise the synagogue, Baptist church, public bath-house and three school buildings. There is a fine hotel opposite the West Jersey and Seashore Company's station. The manufactories are as follows:

Clothing factory of Messrs. Daniel & Blumenthal, 36 x 178 feet; Woodbine Machine and Tool Company, 36 x 280 feet; Quaker City Knitting Company, 49 x 146 feet.

The above are each two stories high and brick buildings. There are also brick and lumber yards; nine carpenters, four bricklayers and twenty-four other mechanics. There are twenty miles of streets laid out, four miles of which have been graded and gravelled. There are twelve miles of farm roads laid out, improved and in excellent condition; an electric light plant has been installed, the power for which is furnished by the Woodbine Machine and Tool Company, which also furnishes the power for the factories; the streets are lighted by forty arc lights. There are no running streams or surface springs on the Woodbine tract; the water-supply is secured from artesian wells, the water from which is pumped into two large tanks, one containing 30,000 gallons and the other 18,000.

The Jews who enter upon farm life are hard workers, and from earliest dawn to sundown the hours are spent in labor on the farm. There are a number of successful farmers in the vicinity, and near to the settlement, on the same tract, are the grounds of the Baron de Hirsch Agricultural and Industrial School, a model institution for secondary education in this country.

This institution was organized in 1893, when Professor H. L. Sabsovich, the Superintendent of the colony, asked permission to arrange for weekly scientific lectures to the farmers during the winter. This institution, assuming the name of the Baron de Hirsch Agricultural and Industrial School, was intended to be purely professional, but as this school dealt with children of the ages from 12 to 16 years, the problem of general education could not be neglected. "To make farmers" was the motto in the beginning. "To make men and then farmers" has become the ideal later on.

The professional purpose of the institution has been gradually superseded by the ideal of general education, and, at present, this school stands as a promoter of general secondary education, recognized by the Paris Exposition, which has conferred upon this school the honors and privileges connected with the highest reward of the exposition—the Grand Prix.

The school was conducted first as an experiment on a comparatively small basis, but gradually it was increased, and at present it comprises an area of 140 acres of cultivated land, a considerable number of cattle, poultry-yards, greenhouses, dairy and apiary, and, besides this, there is a dormitory for the pupils, as well as a school building equipped with the most modern improvements.

The Superintendent, Professor H. L. Sabsovich, is a Russian by birth, and a thorough believer in the power of education based upon the natural development of a child's activity. Professor Sabsovich devoted considerable time to the study of manual training, a system originated in Russia, and has come to the conclusion that the idea of motor-activity is not

complete unless supplemented by the different aspects of agricultural pursuits. Accordingly, the school aims to develop character through manual labor, following a strictly pedagogical sequence proceeding from the simple to the complex.

The pupils admitted to this institution are from 14 to 18 years of age, and during the three-years' course receive instruction in the general branches of study, theoretical agriculture, as well as practical work, which consists in taking care of the stables and animals, work in the fields, garden, nursery, poultry-yards, dairy, hothouses, incubators, brooder-houses, apiary and in the shops. The school supplies its pupils with full maintenance and instruction free, but the pupils are supposed to work for their own livelihood. Hence, while it is a purely philanthropic institution, it does not follow the usual methods of charity.

The course of studies is systematically worked out, and comprises three successive years, respectively designated freshmen, junior and scientific. The instruction in the general branches aims to make good citizens of the scholars, and the practical instruction leads to the development of character and preparation for scientific, practical farming. The life in the institution is rather of a family character. The pupils partake of the work and are interested in the results of the labor, and consider their alma mater their home. Most of the pupils are orphans or homeless children, and it is remarkable to observe the rapid improvement in their conduct, as well as in their general development, in the comparatively short time.

At present the number of pupils reaches the maximum of accommodation, namely, 110, and the number of applicants is so rapidly increasing that it is considered advisable to add to the accommodations in the nearest future, so as to increase the scope of the influence of the institution. The most interesting feature in the work of the institution is the systematic graduation of the different practical lines in which the pupils are engaged. This is quite a new field in educa-

tion, and it is surprising to see the achieved results in the comparatively short time of the institution's existence. The faculty, besides instructors in general branches, consists of special Superintendents of the different practical departments—dairy, poultry, greenhouse, truck and apiary, to which must be added the instructor of the shops for repairing and making agricultural tools and implements. Each department, while working independently, is a part of the whole system, aiming at the same purpose.

The pupils of the school, during the first two years, work in their several departments, and the third year they devote to a special branch, which makes them more efficient as practical assistants after graduation. The graduates of the school have proven very successful, and adhere to their calling.

CARMEL.

The Jewish colony at Carmel is, in many respects, different from those at Alliance and Woodbine. At Carmel there was no purchase of a large tract of land for division among those who came to carve out farms. This settlement was established in 1883, the year following the advent of the colony at Alliance. It was comprised of 100 families, numbering in all about 600 men, women and children. They selected land which lies partly in Millville and partly in Deerfield township. Rude houses were built by the aid of money secured from the building association of the city of Bridgeton, to which, of course, mortgages were given covering the entire properties. Later on the building associations foreclosed the mortgages, and property after property went under the hammer, and the poor settlers were completely disheartened.

At this terrible crisis of affairs, a committee was appointed and sent, with an earnest appeal, to the late Baron de Hirsch. The Baron was not the man to turn a deaf ear to the cries of his countrymen for assistance, and he sent the sum of $5,000

to be loaned to the struggling people in such sums as careful investigation proved to be needed in each individual case.

The soil at Carmel is very good, resembling the soil at Alliance and Woodbine. The crops of white and sweet potatoes are abundant and bring large and sure returns; some of the finest melons produced in New Jersey are raised at Carmel, and the berry and grape crops are of a high standard.

There are some excellent farmers at this settlement; hard workers, who have made a careful study of the capabilities of the soil, who have learned how to treat it to produce the best results, and who are constantly on the alert for all that will elevate and improve their condition. The farms are remarkably neat and present a fine, thrifty appearance.

The town site of Carmel is small and the synagogue is the only public building. There are three manufactories, one in which clothing for men and boys is manufactured and two devoted to the manufacture of ladies' waists and wrappers.

NEW JERSEY A MANUFACTURING STATE.

PREPARED BY MORGAN, OF THE BUREAU OF STATISTICS OF NEW JERSEY.—WILLIAM STAINSBY, CHIEF.

New Jersey is distinctively a manufacturing State, occupying a position in the front rank of the commonwealths of the Union—the products of whose mines, mills and factories have made American industry famous and bid fair to make our country, at no distant date, the "workshop of the world."

In diversity of industries it is not surpassed by any other State, everything known to the wants of man being made within its borders. Factories engaged in all industries are distributed plentifully over the State, enjoying the advantages in the shipment of goods afforded by the network of railroads with which it is traversed, or the cheaper transportation and water-power offered by the numerous navigable streams which flow to tidewater. Whether on the railroad or on the water, the traveler in New Jersey is seldom out of sight of the factory chimney.

There are large cities and towns, such as Newark, Paterson, Jersey City, Elizabeth, Trenton and Camden, with their hundreds of industrial establishments engaged in the production of the particular wares that have made the names of these places famous; others of less size have their share of manufacturing activity, and many prosperous villages and hamlets are found clustered about the one industry which diffuses comfort and happiness among the inhabitants, and which they regard hopefully as the nucleus of future community growth. All have an intelligent appreciation of the value of diversified industry in building up permanent prosperity and elevating the standards of living.

The wise policy pursued by the State in the matter of corporation organization and the care with which legislation likely to hamper industry in even the slightest degree has been avoided, has done much toward bringing this condition of things about.

Many manufacturers from outside the State who were baited in their old homes by laws enacted mistakenly in the interest of a class, have found a welcome refuge in New Jersey, where they enjoy all the natural advantages of the State's geographical position, and many special favors which the communities among whom they have settled are always willing to bestow. Among these are free factory sites, special guarantees regarding tax rates, and frequently, in the case of particularly-desirable industries, capital to assist in establishing the plant.

Almost every town having a population of three thousand or more has its Board of Trade, which offers, on behalf of their respective communities, some one or all of these inducements, and, in many other ways, ably supplement the efforts of the State to make known the resources on which it depends for the maintenance of its position in the great industrial competition now going on between States and nations. That good results have followed these efforts is shown by the increase of industry in all the old centers of manufacturing activity, and the number of new towns established within recent years along the lines of the principal railroads, with factories, which, in most instances, have come from outside of the State, as the basis of settlement.

An inquiry made by the New Jersey Bureau of Statistics in the early part of this year for the purpose of ascertaining the number and location of idle factory buildings, disclosed the astonishing fact that, outside of the first-class cities, there were not more than twelve structures at all adapted to factory purposes that were then unoccupied, and these were, for the most part, places the accommodations of which had been outgrown by the industries that had formerly occupied them. This canvass was made as the readiest means of answering

numerous letters addressed to the Bureau from within and without the State asking where such accommodations might be found. A detailed study of the industries of New Jersey is not intended here; the purpose being merely to refer to them in a general way, giving a little extra attention to, and some leading facts about, the lines of manufacture in which the State is pre-eminent.

According to the United States Census of 1890 there were only five States, viz., New York, Pennsylvania, Massachusetts, Illinois and Ohio, whose yearly product of manufactured goods exceeded in value that of New Jersey, which was $354,573,571. In the production of silk goods New Jersey was far ahead of all other States; its output for the census year being valued at $30,760,371, as against $87,298,454 for the entire Union. In clay products, including pottery, it was also first; in glass, leather, and leather products and jewelry it ranked second. Pennsylvania only producing more glass and Massachusetts more leather goods and jewelry.

The United States census data for 1900 not being available, the present rank of New Jersey among the manufacturing States cannot be accurately determined. It was sixth in 1890, and those best acquainted with the subject have faith that the new figures, when issued, will give it a higher place.

The Bureau of Statistics of New Jersey publishes a report each year, with carefully-prepared tables, in which all the manufacturing establishments in the State, grouped under their proper industry heading, have a place. Quoting the latest report of the Bureau (1900), there are eighty-nine of these general groups of industries, of which the largest and most important in every respect is the manufacture of silk goods—broad and ribbon.

THE SILK INDUSTRY.

There are now 152 silk mills and silk dye-houses in New Jersey, 107 of which are in the city of Paterson. A majority of the others are in West Hoboken or Jersey City.

The following abstract of the State Bureau's report will show the proportions of the industry for 1900:

Number of establishments	152
Capital invested in plants	$22,449,407
Value of stock or material used	$24,643,608
Selling value of goods made	$43,369,405
Average number of persons employed	27,704
Total amount paid in wages	$10,658,137

The census of 1890 credited New Jersey with 132 establishments engaged in the silk industry; these mills employed 17,918 persons, used material valued at $17,908,883 and produced goods that sold for $30,760,371.

The increase shown by these figures, while large, does not adequately represent the advance made in this important industry during the last decade; there are only twenty more mills, but almost all the old establishments have been largely increased in size during the past four years, and 10,000 more persons are now employed. The increase in the value of product is $12,609,034, but it must be borne in mind that the selling value of silk goods, owing to improved processes of manufacture, is now much lower than it was ten years ago, and that, therefore, the gain in actual quantity of goods produced is greater than that shown by the difference in selling value. New Jersey is justly proud of her pre-eminence in the silk industry, the product of which is the chosen garb of the highest civilization; proud also of her "silk city" of Paterson, the "Lyons of America," from the looms of which comes fully one-half of the New World's product of this beautiful fabric, and looks confidently ahead to the not far-distant time when her output will surpass, in quantity and quality, that of her famous Old World rival.

Other industries in which New Jersey manufacturers hold a leading place are the production of brick and terra-cotta, glass, men's hats, jewelry, pottery, leather, shoes, woolen and worsted goods, chemical products and refined oils (including by-products of refinery).

The number of establishments engaged in each of these industries, the capital invested, value of material used and of goods made, &c., is taken from the report of the New Jersey Bureau of Statistics for 1900.

BRICK AND TERRA-COTTA.

Number of establishments	66
Capital invested in plants	$7,059,502
Value of stock or material used	$1,384,935
Selling value of goods made	$4,931,838
Average number of persons employed	6,596
Total amount paid in wages	$2,013,843

GLASS—WINDOW AND BOTTLE.

Number of establishments	23
Capital invested in plants	$4,045,452
Cost value of stock or material used	$1,416,693
Selling value of goods made	$4,936,726
Average number of persons employed	6,358
Total amount paid in wages	$2,438,246

MEN'S FELT AND WOOL HATS.

Number of establishments	5[illegible]
Capital invested	$2,155,28[illegible]
Cost value of stock or material used	$3,750,012
Selling value of goods made	$7,548,64[illegible]
Average number of persons employed	5,58[illegible]
Total amount paid in wages	$2,559,917

JEWELRY.

Number of establishments	65
Capital invested in plants	$3,174,095
Cost value of stock or material used	$3,252,708
Selling value of goods made	$6,489,470
Average number of persons employed	2,659
Total amount paid in wages	$1,364,846

POTTERY.

Number of establishments	30
Capital invested in plants	$5,502,462
Cost value of stock or material used	$1,217,864
Selling value of goods made	$4,943,341
Average number of persons employed	3,705
Total amount paid in wages	$1,981,118

LEATHER.

Number of establishments	55
Capital invested in plants	$6,279,174
Cost value of stock or material used	$7,394,687
Selling value of goods made	$12,047,017
Average number of persons employed	3,893
Total amount paid in wages	$1,781,478

SHOES.

Number of establishments	48
Capital invested in plants	$2,320,191
Cost value of stock or material used	$3,670,981
Selling value of goods made	$6,682,954
Average number of persons employed	4,882
Total amount paid in wages	$1,755,945

WOOLEN AND WORSTED GOODS.

Number of establishments	38
Capital invested in plants	$7,959,617
Cost value of stock or material used	$6,543,420
Selling value of goods made	$10,515,033
Average number of persons employed	7,623
Total amount paid in wages	$2,040,666

CHEMICAL PRODUCTS.

Number of establishments	42
Capital invested in plants	$13,798,456
Cost value of stock or material used	$8,104,981
Selling value of goods made	$13,800,362
Average number of persons employed	3,400
Total amount paid in wages	$1,572,793

REFINED OILS AND THEIR BY-PRODUCTS.

Number of establishments	14
Capital invested in plants	$17,342,953
Cost value of stock or material used	$30,371,378
Selling value of goods made	$34,102,998
Average number of persons employed	2,797
Total amount paid in wages	$1,579,342

Every stage of iron and steel manufacture, from mining the ore to constructing ships, bridges, the frames of great buildings, machinery of every known type and the endless variety of other products of these metals, is carried on in New

Jersey; there are mines which produce a superior grade of iron ore, and blast furnaces where it is reduced to pig; puddling works in which it is converted into steel and refined iron; rolling mills to work it into convenient bars, and hundreds of machine shops and foundries in which it is wrought into the multitudinous forms demanded by the commerce and industry of the world.

THE CHIEF MANUFACTURING CENTERS OF NEW JERSEY AND THEIR PRINCIPAL INDUSTRIES.

NEWARK.

Newark has the largest population and the greatest diversity of industries of any city in New Jersey. Indeed, it is claimed for it that a wider variety of articles are made in its factories than in any other city in the Union. In the value of its annual output of manufactured goods it ranked as the twelfth American city according to the census of 1890, $100,052,208 being the amount given.

It is first in the manufacture of leather, jewelry and celluloid. For many years the manufacture of leather has been a leading industry in the city, the tanneries growing steadily in number and size, until now there are forty-six of them in Newark out of the fifty-seven in the entire State.

The manufacture of celluloid is in a peculiar sense a Newark industry; it is here the inventor of this almost epoch-making article lived and perfected the invention, out of which an industry of vast proportions, that supplies hundreds of articles of utility and ornament to the commerce of the world, has grown. There are now three great plants engaged in this industry, owned by the Celluloid Manufacturing Company. The capital invested amounts to nearly $2,000,000, and 675 persons are employed.

Jewelry is a line of manufacture in which New Jersey ranks second; as stated before, it was surpassed in 1890 only

by Massachusetts. There were then seventy-four establishments engaged in the industry, and the product was valued at $4,724,000. There are now sixty-seven plants engaged in the trade, all located in Newark, and their product for 1900, according to reports made to the New Jersey Bureau of Statistics, amounted to $6,489,470, an increase of $1,765,470, or 37 per cent.

The brewing of malt liquors is another industry for which Newark is famous; quoting again the New Jersey Bureau of Statistics, there are now thirty-two breweries in the State, having an invested capital of $17,165,800; 1,800 men are employed, and $1,398,075 was paid in wages; their joint product was 1,983,241 barrels of lager beer, ale, porter and other malt liquors, the selling value of which was $11,691,016. Sixteen of these establishments are in Newark.

The manufacture of hats is another industry in which New Jersey was first among the States in 1890. The table given above shows its proportions in 1900 and the details do not require repetition here. The factories are all located in the Oranges or Newark.

These are the industries, and they are among the most important in the United States, that may be regarded as distinctively belonging to Newark. The fact that they have reached such proportions in that city shows that conditions there are more favorable to their growth and expansion than elsewhere.

PATERSON.

The production of silk goods is the chief industry of Paterson. There are 107 mills within the city limits and several large ones in the outlying towns, many of whose operatives reside in the city. Most of the mills are very large, several of them employing from 500 to 1,000 persons. Altogether fully 25,000 out of the nearly 28,000 employed in the entire State find work in the Paterson mills.

Other important contributary industries have grown up in Paterson around the silk industry. There are fifteen firms

engaged in the production of silk-mill supplies, and several large machine shops that make nothing but silk machinery.

The next most important industry of Paterson is its machine shops. There are two locomotive works—the Cook Locomotive and Machine Company and the Rogers Locomotive Works.

The first-named company turned out in the year 1900 120 locomotives, which were sold for $1,508,618. The Rogers works has been doing little or nothing for the past year, owing to the retirement of the old management, but are now about to resume operations under the control of new men.

Twelve large machine shops produce silk and other special machinery, one devotes itself entirely to that required for making rope and twine. There are numbers of combined machine shops and foundries. Steam engine and boiler works, jute machinery, iron and brass castings, files and rasps of a superior quality, and a great variety of other metal products are turned out by Paterson establishments.

In the textile industries, outside of silk, Paterson has several mills engaged in the production of white wear for men and women, in which nearly 1,500 hands are employed. There is also a large dye-house for dyeing and finishing cotton goods; one manufactory of carriages and wagons, four of paper boxes, one of carpets and rugs and one of food products makes a list that is fairly representative of the city's main industries.

JERSEY CITY.

Jersey City has no one special industry with which, like Paterson or Trenton, its name is particulary associated. Manufacturing on a large scale and covering a wide range of articles is carried on there.

Its greatest single industry and largest manufacturing establishment is the plant of the P. Lorillard Tobacco Company, which covers two city blocks and employs nearly 2,000 hands.

The principal industries and the number of establishments engaged in each of them is as follows:

Boilers—steam	2	establishments.
Boxes—wood and paper	3	"
Breweries	2	"
Chemical products	5	"
Electrical appliances	1	"
Food products	2	"
Foundry—brass	2	"
Furnaces, ranges, &c.	3	"
Graphite products	2	"
Lamps and chandeliers	1	"
Machinery	4	"
Metal goods	4	"
Paints	2	"
Rubber goods	3	"
Silk goods	3	"
Soap, tallow and perfumery	6	"
Steel and iron—bar, structural and forgings	5	"
Thread and twine	1	"
Watch works	1	"
Cooperage	5	"
Sugar refining (American Company),	1	"
Zinc works—refining zinc ore	1	"

TRENTON.

Pottery.—Trenton has thirty large pottery plants, in which about 3,750 hands are employed. Particulars as to capital invested, value of product, &c., have been given in another part of this article.

The potteries of Trenton are, almost without exception, large, and fitted with modern machinery of types best suited to the production of the lines of ware which is made in each of them. The management is in the hands of men thoroughly acquainted with every detail of the business, as is proven by the high rank held by Trenton ware in the pottery trade of the world. Every grade of goods, from the plainest earthenware to the finest decorated China and porcelain, is made here. Plumbers' sanitary ware is a specialty in some establishments, which find all they can do in supplying orders.

Structural Steel and Iron.—The industry next in importance to pottery is the structural steel and iron works of the

New Jersey Steel and Iron Company, the John A. Roebling's Sons' Company and the Trenton Iron Company.

All the material used in the engineering works carried on by the Roeblings is supplied by these Trenton plants. In the works upward of 2,000 hands are employed, and on the outside a much larger number is engaged in construction.

Rubber.—The rubber industry is carried on in Trenton on probably a larger scale than elsewhere. There are ten plants. which employ nearly 2,000 hands, and make rubber into almost all known commercial forms.

The manufacture of oil-cloth and linoleum, carriages, brass lamps and bedding is carried on in Trenton on a large scale.

ELIZABETH.

Sewing Machines.—Elizabeth's most important industry, the one which gives steady employment to more than one-half of its wage-workers, is the manufacture of sewing machines.

The home factory of the Singer Manufacturing Company, which is said to be the greatest manufacturing industry in the world, is located here.

The buildings are immense in size—the one in which machining and constructing operations are carried on being five stories in height and only a little less than one-half mile long. In the enclosure formed by this building and those used for foundry and forging purposes there is twenty miles of railroad track and four locomotives are in constant use for carrying stock used in the works from one department to another. More than 5,000 hands are at present employed there in manufacturing Singer sewing machines of thirty or forty distinct types; the yearly output is about 500,000 machines.

The Singer company has 8,000 offices in the United States for the sale of their product, and employ in all the various ramifications of their business, as agents, salesmen, instructors, &c., about 50,000 persons in the United States and Canada.

Ship-building.—The Crescent Ship-building Company (Lewis Nixon's yard) is located here; although not as large as some other ship-building plants in the country, its reputation for good work and promptness in carrying out contracts is of the very best. It was here the "Bancroft" and "Annapolis," both fine gunboats, were built; the wonderful submarine torpedo boat "Holland" was also constructed at this yard. More than one hundred craft, large and small, have been launched within ten years. The Crescent company has now on the stocks and nearing completion one monitor and several torpedo boats and destroyers. About 500 men are at present employed in the yard. Other important industries of Elizabeth are one large foundry, employing 450 hands; four machine shops, making steam engines and general machinery. These employ together about 1,200 hands. There are a large number of smaller factories engaged in producing a wide variety of useful things, such as wire, rubber, leather, roofing material and builders' materials.

NEW BRUNSWICK.

New Brunswick has several large industries, the chief among them, in the number of hands employed, being the Norfolk and New Brunswick Hosiery Company, which employs nearly 700 hands, and in 1900 produced goods valued at $600,000.

Other important industries are:

The Consolidated Fruit Jar Works, makers of all kinds of sheet-metal goods; two large establishments for the manufacture of wall paper, a rubber works in which bicycle tires are made, a manufactory or laboratory for making surgical bandages or dressings, and a cigar factory. All these establishments are among the largest in the country producing the lines of goods in which they are engaged. Each of them employs 500 hands or more, and pays large sums annually in wages.

PASSAIC.

Passaic is entitled to high rank among the manufacturing cities of New Jersey; its factories and mills have grown in size and number during the past five or six years, until now it has, in certain lines of manufacture, the largest mills in the State. The production of woolen and worsted goods is Passaic's chief industry. The Botany Mill is the largest single establishment in the city and the greatest of its kind in the country. Upwards of 3,500 persons are employed there, and worsted and woolen dress goods and yarns to the value of $3,480,000 were produced in 1900. There are five other mills in which worsted and woolen goods are turned out, that employ between them about 800 persons.

Other important textile industries carried on in Passaic is the manufacture of cotton cloth and dyeing, printing and finishing the same. Six large mills are engaged in this work, many hundreds of hands are employed and the yearly product of goods runs well into the millions.

There are many other towns in New Jersey in which manufacturing is carried on as the principal business of the community. Indeed, it may be truthfully said that, outside of the coast resorts, which have large populations during the summer and are practically deserted at other seasons of the year, every town in New Jersey is, to some extent, a manufacturing center. The enterprise of the people has always been quick to take advantage of natural conditions, and so glass plants, some of them the largest in the world, are found at Millville, Vineland, Bridgeton, Fairton, Swedesboro, Clayton, Glassboro, Woodbury, Salem and Williamstown, in Cumberland, Gloucester and Salem counties, where a superior quality of glass sand is found in immense beds, with practically an inexhaustible supply of wood for fuel.

On the coast, where the fishing and oyster industry is carried on, there are factories for converting the non-edible fish and the waste parts left by the main industry into fertilizers, or fish guano.

At Perth Amboy and Red Bank, owing to the presence of proper clays in great abundance, there are immense brick and terra-cotta making plants. . On the waste of meadow land running from Newark to the Raritan river the shore line is dotted with large fertilizer works, so far removed from population as to cause no annoyance on account of odor, and having the advantage of cheap water routes in the shipment of product.

To enumerate all the articles made in the factories and workshops of New Jersey would be to go over the entire list of things, great and small, that are known to the wants of man.

In some of the industries named, the State ocupies a leading position, and in all others her place is not much behind the foremost.

The number of wage-earning men and women employed in the factories and workshops is approximately 200,000; these are among the most intelligent and best-paid operatives in the country, and the value of the annual product of their labor is not much less than $400,000,000.

The Bureau of Statistics will cheerfully answer inquiries which parties interested in the industries of New Jersey may address to it.

Information will be given regarding the various lines of manufacturing carried on in the State, the location of establishments engaged in them, and the names of cities and towns which offer special inducements for the location of manufacturing plants.